UGC Journal Details

Name of the Journal :	Research Journey
ISSN Number :	
e-ISSN Number :	23487143
Source:	UNIV
Subject:	Marathi
Publisher:	Swatidhan International Publication
Country of Publication:	India
Broad Subject Category:	Multidisciplinary

Print

KVN Naik Arts, Commerce & Science College, IQAC OFFICE

Co-ordinator
I.Q.A.C.
KVN Naik Arts, Commerce
& Science College, Canada Corner,
Nashik-422 002.

विश्वविद्यालय अनुदान आयोग
University Grants Commission
quality higher education for all

UGC Approved List of Journals

|| Home (journal_list.aspx) ||

You searched for **r**

Total Journals : 1436

Show 25 entries Search: Research journey

View	Sl.No.	Journal No	Title	Publisher	ISSN	E-ISSN
View (ugc_admin_journal_report.aspx?eid=NDA3MDU=)	1168	40705	Research Journey International E Research Journal	Swatidhan Pub. Yevla		23487143
View (ugc_admin_journal_report.aspx?eid=NDQxMTc=)	1220	44117	Research Journey	Swatidhan International Publication		23487143

Showing 1 to 2 of 2 entries (filtered from 1,436 total entries) Previous 1 Next

For UGC Officials

› e-Office (https://ugc.eoffice.gov.in/acl_users/credentials_cookie_auth/require_login?came_from=https%3A//ugc.eoffice.gov.in/)
› NIC mail (https://mail.gov.in/iwc_static/c11n/allDomain/layout/login_gov2.jsp?lang=en&3.0.1.2.0_15121607&svcs=abs,im,mail,smime,calendar,c11n)
› RTI online (https://rtionline.gov.in/RTIMIS/login/index.php)
› PG portal (https://pgportal.gov.in)

KVN Nalk Arts, Commerce & Science College, IQAC OFFICE

RESEARCH JOURNEY International Multidisciplinary E-Research Journal | ISSN- 2348-7143
Impact Factor - (SJIF) – 6.261, (CIF) - 3.452, (GIF) –0.676 Special Issue - 98 | January 2019 | UGC Approved No. 40705
Biodiversity conservation-present scenario and future prespective

Aeromycological Studies With Special Refernece to Diurnal Periodicity of *Alternaria* and *Nigrospora* Spores in Guava Orchards at Nasik.

Shinde H.P.
Department of Botany, K.V.N. Naik College, Nasik.

ABSTRACT

The present study was conducted at Nasik, which, besides the pioneer city in fruits, flowers & vegetables production, is one of the biggest guava growing pockets in the Maharashtra state. Diurnal periodicity studies on the occurrence of airborne fungal spore types like *Alternaria* and *Nigrospora* were conducted during the aerobiological monitoring by using volumetric Tilak air sampler for the period of 1st January 2013 to 31st December 2014. During this whole period of investigation, fungal spore trapping was done by operating continuously Tilak air sampler (Tilak and Kulkarni; 1970). The consecutive meteorological factors such as temperature, relative humidity and rainfall were monitored. This study revealed that the fungal spore types *Alternaria* and *Nigrospora* in the present investigation belong to nightspora. The maximum concentration of *Alternaria* was recorded in the months of July and August; whereas *Nigrospora* was recorded maximum in the month of June. There exist some diurnal rhythms in fungal components of the airspora and these are correlated to the periodicity of environmental factors.

Keywords: Diurnal periodicity, Guava, Nasik.

INTRODUCTION

Aerobiology is a newly emerging interdisciplinary branch of environmental science that studies airborne bioparticles. (Tilak *et al.* 1983, Subba Reddy and Janakibai, 1977). Aerobiology is the branch of biology which mainly studies small particulate matter that constantly floats on air (Spieksma, 1991). The study of airborne bio particles exists as a basis for the aerobiological research in the fields of agriculture, horticulture, forestry, understanding aeroallergens and allergic diseases etc. Roy and Trivedi (1996) have provided useful data on the role of meteorological factors and the occurrence of fungal spores in the air. Diurnal rhythms have been categorized as night patterns, post dawn patterns, middle day patterns and double peak patterns. Meteorological and topographic factors have been recognized for varying diurnal rhythms. (Mishra & Deshmukh; 2009).

Fusarium caused wilt affected guava plants; have been studied by Pandey and Dwivedi (2008) Gupta *et al.* (2010) at different cities across the India. In India, the incidence and periodicity of *Alternaria* spores was studied and reported earlier by Bhati and Gaur (1979), Janaki Bai and Reddi (1981), Vitthal and Glory (1985), Gupta *et al.* (1999), Tiwari *et al.* (2006), Das and Gupta-Bhattacharya (2008), Mali and Pande (2008) Sharma (2009), Hasnain *et al.* (2011), Thirumala and Nathu (2013), Ghosh *et al.* (2014), Vermani *et al.* (2014) during aerobiological studies at several places.

Kaczmarek *et al.* (2015) studied the effect of climate change on sporulation of *Leptosphaeria* species; causing stem canker of Brassicas. Aher and co-workers (2015) carried out qualitative assessment of airborne deuterospores over Pomegranate (*Punica granatum* L.) at Ahmadnagar district, Maharashtra. The diurnal periodicity studies of some important fungal spores like *Didymospaheria* and *Leptosphaeria*, *Alternaria, Cladosporium* and *Cercospora* were carried out by Abu-Dieyeh and Barham (2014) in Zarqa, Jordan, Thakur and Jite (2015) at Pune, Baraskar and Patil (2016) at Jamkhed, Ahmednagar, Maharashtra.

Also, in Nashik city and other cities of Maharashtra state, the spores of *Alternaria* was studied by Patel and Pawar (2012), Ahire and Sangale (2012), Pande *et al.* (2012), Aher *et al.* (2015), Patil *et.al* (2015).

MATERIALS AND METHOD

Study area:

The present study was done to assess fungal airspora of guava fruit orchard located in Nasik city. Nasik, besides the pioneer city in fruits, flowers & vegetables production, is one of the biggest guava growing pockets in the Maharashtra state. Guava is an emerging important horticultural crop of Nasik district after grapes and pomegranates. The Nasik is the 3rd important city of Maharashtra state after Mumbai, and Pune. The selected site for the present investigation is situated along the bank of Godavari river in Nasik city.

Sampling method:

The volumetric Tilak air sampler (Tilak & Kulkarni, 1970) was used for the aerobiological studies. The Tilak air sampler was installed on iron made stand at a constant height of $4^{1/2}$ feet from the ground. Air was sampled at the rate of 5 litres /minute and the transparent cellotape coated with white petroleum jelly that was changed every 8 days at about 6 pm. For this, the rotating drum of the sampler was separated and the cellotape with keeping its non-sticky surface in outward direction; was fixed properly around the external rim of the rotating drum. The cellotape was then coated with thin layer of white petroleum jelly. After this, the rotating drum, along with petroleum jelly coated cellotape; was repositioned properly at its place with the help of central screw provided within the sampler. After continuously operating for 8 days; the rotating drum of the sampler was separated; so as to get cellotape removed and repositioned again. The mounting of the cello tape having catches of spores; is done in glycerine jelly which was prepared separately.

Before the cello tape was mounted on the clean glass slide at the end of 8 days, it was divided into 16 equal parts as marked on the drum, each part measuring 4.2 cm. in length. Each piece of the cello tape now obtained; represent the 12 hours sampling for a day or night accordingly. The cellotape for 12 hours is mounted on clean slide in a glycerine jelly. Also, scanning was done by dividing this cellotape further, into 6 equal parts, each part representing 2 hours trace area. The pieces of cellotape were mounted on microscopic slides using glycerine jelly as a mount.

Scanning and identification of bioparticles:

Total 9600 sq. micron of the area was obtained during daily scan by using 10X and 45X eye pieces of the compound microscope as well as stereoscopic binocular research microscope with camera attachment. The counting of fungal spores and other bioparticles was done by Hirst's short transverse method (1959). The prepared glass slides were scanned regularly & identification of bioparticles was based on microscopic diagnostic features, reference slides & available literature.

The percentage contribution of these spores has been calculated on the basis of bihourly catches of each spore type for 24 hour period. Accordingly, the mean diurnal periodicity curves for *Alternaria* and *Nigrospora* were prepared.

Meteorological data:

During the period of investigation; consecutive daily meteorological parameters such as temperature, relative humidity and rainfall were monitored. The day to day mean temperature, relative humidity, average rainfall and wind velocity has been collected from the Hydrology unit, Maharashtra Engineering Research Institute, (M.E.R.I.); located at Panchavati region, Nasik.

During the period of investigation; the observations on the diurnal periodicity of fungal spores, the prominent fungal diseases occurred on guava plants; were recorded and these were correlated with the changing meteorological parameters. Thus, the analysis of collected aerobiological data on the diurnal occurrence of fungal spores was done during this period.

RESULTS AND DISCUSSION

Both the fungal spores *Alternaria* Nees. and *Nigrospora* Zimm. are the known rapidly growing plant pathogens. The distinct diurnal periodicity patterns of these spores have distinguished broadly between their occurrence as a dry spora and wet spora. (Agashe and Anuradha, 1996).

Diurnal distribution of *Alternaria* Nees. :

Peak concentrations of *Alternaria* spores usually occur in late summer. The maximum contribution of *Alternaria* found 2151/m^3 in month of February 2013, whereas its minimum concentration was 1152/m^3 in August 2013. Likewise; in the year 2014, it was recorded maximum 5696/m^3 in the month of May; it was minimum 419/m^3 in two months; January & October (Table I). The diurnal periodicity studies of *Alternaria* spores revealed that; these spores belonged to dayspora type because they were present throughout the day; however; their rapid liberation occurred at about 8.00 to 12.00 hours of morning and reaching its peak at about 12.00 p.m. (Fig.I).

Diurnal distribution of *Nigrospora* Zimm. :

The spores of *Nigrospora* are reported very commonly in warm climate; their increased concentration was observed in the months of April 2013 & 2014. Besides known potential plant pathogens; both these spores have been reported as allergic spores in nature.

The maximum contribution of *Nigrospora* found 4451/m^3 in month of April 2013, whereas minimum concentration of it was 264/m^3 in January 2013. Likewise; in the year 2014, it was recorded maximum 2995/m^3 in the month of April, it was minimum 517/m^3 in January 2014 (Table I). The diurnal periodicity studies of *Nigrospora* revealed that, *Nigrospora* spores belong to dayspora. Although the spores were present throughout the day; but the maximum concentration of these spores were recorded between 8.00 am to 12.00 pm and reaching its peak at about 10.00 am. (Fig. I).

During the whole period of investigation, the occurrence of *Alternaria* spores was recorded maximum in the months of February and May; when the average values of relative humidity 55.35% and temperature 28.0°C with the wind velocity 4.72 mph. were recorded. Similarly, the occurrence of *Nigrospora* spores was recorded maximum in the months of April for both the years of investigation; when the average values of relative humidity 40.90% and temperature 36.56°C with the wind velocity 3.80 mph. Thus the maximum occurrence of this spore type could be correlated with the prevailing weather parameters like slightly increased temperature with the minimum amount of relative humidity and wind speed. Such pattern of diurnal distribution of airborne fungal spores is found to be associated with the increase in temperature at morning hours and reduced relative humidity (Royes, 1987). In some cases, concentration of airborne fungal spores found to be increasing with the increase in wind speed during morning hours; Nussbaum (1990), Jones and Harrison (2004).

The significant losses are caused due to occurrence of *Alternaria* and *Nigrospora* in the guava orchard and similar reports were made by earlier workers like Chawda and Rajasab (1994) Channabasavraj *et al.* (1994) in onions and carrots and also by many workers like Vitthal and Glory (1985), Tiwari *et al.* (2006), Kavita Sharma (2011), Patel and Pawar (2012), Sonawane (2013), Aher *et al.* (2015).

The diurnal periodicity studies of *Alternaria* showed that their concentration remains elevated during early morning hours. The morning concentration peak may be due to the heat of the arsing sun. At the onset of sunrise, steady increase in the temperature, wind speed with the rapid decrease in the relative humidity; favours more and easy release of these spores into the air.(Cox and Wathes; 1995). Increased production and incidence of *Alternaria* and *Nigrospora* especially during dry periods can be explained on the basis of changing climatic factors like temperature and relative humidity. (Shrivastava, 2007). The lower concentration of *Alternaria* was recorded by

Pathak and Pady (1965), Derrick (1966) recorded conidia in large numbers to January, Sheehy and Huguelate (1967) encountered the spores between 09.00 hrs. and 16.00 hrs.

It is well established fact that the concentration peaks of airborne fungi have been found to be varied among various studies all over the world mainly due to differences in climatic conditions, vegetation and topographical factors.

Table I: Maximum and minimum occurrence of spore types during the whole period of investigation.

Types	Investigation	occurrence (month)	concentration	occurrence (month)	concentration	peak liberation
Alternaria	2013	February	2151/m^3	August	1152/m^3	12.00 hrs.
	2014	May	5696/m^3	January& October	419/m^3	
Nigrospora	2013	April	4451/m^3	January	264/m	10.00 hrs.

Fig. 1. Diurnal Periodicity curve of average percentage contribution of *Alternaria*

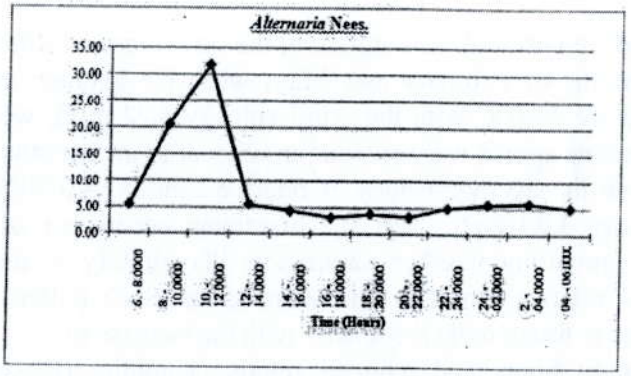
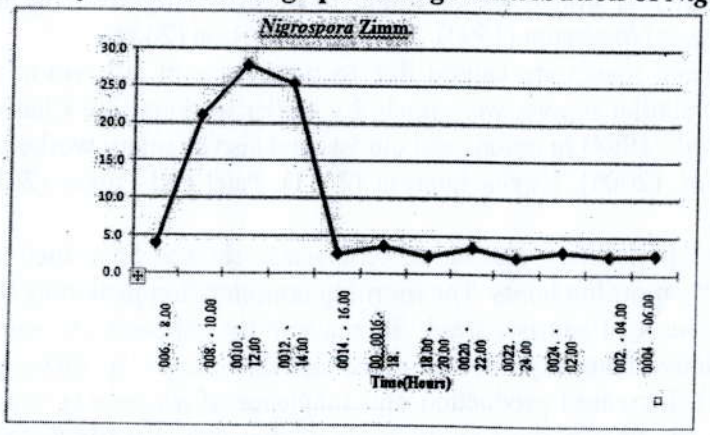


Fig. 2. Diurnal Periodicity curve of average percentage contribution of *Nigrospora*



REFERENCES

1. Abu- Dieyeh, M.H. Barham, R. (2014). Concentration and dynamics of fungal spore populations in the air of Zarqa, Jordan; using volumetric method. *Grana* Vol.53 no.2 117-132.
2. Adams, K. F. and Hyde, H. A. (1965). Pollen grains and fungal spores indoors and outdoors at Cardiff. *J. Palynol.*, **1:** 67-69.
3. Ahire, P.P. (1990). Airspora at Nasik, *Ph.D. Thesis*. Dr. Babasaheb Ambedkar marathwada university, Aurangabad.
4. Amin, K. S., Baldev, B., & Williams, F. J. (1978). *Phytophthora cajani*, a new species causing stem blight on *Cajanus cajan.Mycologia* **70(1)**, 171-176.
5. Ball, G. F., and Ketterson, E. D. (2008). Sex differences in the response to environmental cues regulating seasonal reproduction in birds. *Philosophical Transactions of the Royal Society of London B: Biological Sciences,* **363(1490):** 231-246.
6. Baraskar S. M. and Patil S. R. (2016). Circadian periodicity study of some fungal spores over Jowar crop field at Jamkhed district Ahmednagar, Maharashtra. *Asian journal of multidisciplinary studies* **4(8)**, p.p. 237-241.
7. Dawidziuk, A., Kaczmarek, J., Podlesna, A., Kasprzyk, I., Jedryczka, M. (2012). Influence of meteorological parameters on *Leptosphaeria maculans* and *L. biglobosaspore* release in central and eastern Poland *Grana*, **51:** 240–248.
8. Di Menna, M. E. (1955). A quantitative study of air-borne fungus spores in Dunedin, New Zealand. *Transactions of the British Mycological Society*, **38(2):** 119-129.
9. Gage, S. H., and S. A. Isard. (2000). Flow of Life in the Atmosphere: An Airscape Approach to understanding invasive Organisms. *Michigan State Press*. pp. 4-7.
10. Gregory, P. H. (1961). The microbiology of the atmosphere. *Leonard hill Ltd., interscience Publishers INC.*, New York. pp. 223.
11. Grinn-Gofroń, A., Mika, A. 2008. Selected airborne allergenic fungal spores and meteorological factors in Szczecin, Poland, 2004–2006. *Aerobiologia,* **24:** 89–97.
12. Gupta, V. K., Mishra, A.K., Gaur, R.K. (2010). Current status of Fusarium wilt disease of Guava (*Psidium guajava* L.) in India, *Biotechnology* **9(2):** 176-195, *ISSN 1682-296X.*
13. Ingold, C. T. (1965). Spore liberation. *Clarendon press. Oxford.* **1:** 210-220.
14. Janaki Bai, A., & Reddi, C. S. (1981). The fungul airspora of Visakhapatnam. *Proc. Indian nat. Sci. Acad.* Vol. **47:** pp. 731-747.
15. Meredith, D. S. (1962). Some components of the airspora in Jamaican banana plantations. *Annals of Applied Biology*, **50(3)**: 577-594.
16. Mishra, R. R. and Srivastava, V.S. (1969). Aeromycology of Gorokhpur. V. Air spora over Wheat and Barley fields. *Proc. 5. Ind. Sci. Cong. Bot. Sect.* Abstract no.99. *publishers,* Netherlands. pp. 6-11.
17. Rai, M. K., Asthana, P., Jaiswal, V.S. (2009). Biotechnologial advances in guava: Recent developments and prospects for further research. Trees 24(1):1-12.
18. S.A.M.H. Naqvi (2004). Diseases of fruits & vegetables. Vol. II. *Kluwer Academic*
19. Sreeramulu, T., Ramlingam, A. (1964). Some short period changes in the atmospheric spore contents associated with changes in the weather and other conditions. *Proc. Ind. Acad. Sci.*, **59:** 154–172.
20. Subba Reddi, C. (1970). A comparative survey of atmospheric pollen and fungus spores at two places twenty mile apart. *Acta. allegrol.*, **25:** 189-215.
21. Subbareddy, C., Janakibai, (1977). Circadian periodicity in airborne spores of *Dedryphiella, pestalosia* and *Periconia. Ind. Phytopath.*,**30(4):** 570–572.

22. Thakur, V. A., and Jite, P. K. (2015).Circadian periodicity studies in the incidence of airborne spores of *Leptosphaeria* and *Didymospaheria*, Pune, India. *Int. J. Curr. Res.Aca.Rev.*, **3(4)**: 185-189.
23. Tilak, S. T. (1982). Aerobiology and its practical applications. *Proc. I. Nat. Conf. Envirn. Bio.*33-38.
24. Tilak, S.T. and R.L. Kulkarni (1970). A new air sampler. *Experentia*. **25:** 443-444.
25. Tilak, S.T., Babu, M. (1983). Diurnal periodicity in the incidence of airborne ascospores of *Didymosphaeria* and *Leptosphaeria Acta Botanica Indica,* **11**:246–247.