

Aerobiological Study of APMC Fruit Market Kalyan, District- Thane, Maharashtra

R. N. Baviskar

Department of Botany

ICLES' Motilal Jhunjhunwala College, Vashi, Navi Mumbai, Maharashtra, India

baviskar_ramesh@yahoo.co.in

Abstract: The present study was aimed to investigate aeromycoflora of APMC fruit market of Kalyan, Dist- Thane was conducted during two consecutive seasons from August to October, 2020 and August to October, 2021. During this period Peach (*Prunus persica* L.) are abundant in the fruit market of Kalyan. The aerobiological study was carried out by using gravity slide as well as petriplate exposure method with a view to correlating the decay of peach fruits in the market. Twenty five aeromycoflora were catch out from the air over the fruit market and the *Alternaria alternata*, *Botrytis cinerea* and *Rhizopus stolonifer* are the three most common causative factors of peach rot and loss.

Keywords: Peach, APMC Fruit Market Kalyan, Aeromycoflora

I. INTRODUCTION

The growth of filamentous fungi in highly perishable fruits including peach is significant quality problem that may lead to significant economic losses. Present investigation deals with the study of aeromycoflora of APMC fruit Market, Kalyan. Keeping in this view attempt was made to investigate the aeromycoflora on peach in Kalyan fruit market and observed twenty five fungi viz. *Alternaria alternata*, *A. flavus*, *Aspergillus fumigatus*, *A. niger*, *A. tenuis*, *Botrytis cinerea*, *Curvularia lunata*, *Mucor piriformis*, *Penicillium chrysogenum*, *Penicillium citrinum*, *Penicillium commune*, *Penicillium digitatum*, *Penicillium expansum*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium regulosum*, *Penicillium solitum*, *Phytophthora acactorum*, *Phytophthora parasitica*, *Rhizopus arrhizus*, *Rhizopus nigricans*, *Rhizopus stolonifer*, *Sclerotinia fructigena*, *Sphaeropsis pyripitrescens* and *Venturia inaequalis*. Above twenty five fungi were pathogenic as well as non-pathogenic. The pathogenic fungi viz. *Alternaria alternata*, *Botrytis cinerea* and *Rhizopus stolonifer* were dominant and serious on peach fruits. It is much severe and causing *Alternaria* rot, gray mold and *Rhizopus* rot respectively. The extensive variety of biological particles present in the atmosphere, there is a very significant number of fungal spores. The biopollutants of the atmosphere are causing serious diseases of crops in the vegetable and fruit markets. These agricultural commodities are being attacked in their post harvest conditions viz. in packaging, transit, trans-shipment and storage. Many workers investigated the occurrence of aeromycoflora in the different crop field and their correlation with the different diseases of fruits viz (Papaya, banana, citrus and pineapple), cereals (rice, jawar, wheat and bajara), sugarcane etc. (Tilak and Kulkarni, 1980; Sharma and Bhattacharjee, 2001; Medhi and Sharma, 2010) studied the aeromycoflora in the fruit markets. Peach in the market of Kalyan were reported to be decayed due to the invasion of certain microbes. In view of the above reports major vegetable and fruit markets of Kalyan, Dist- Thane was surveyed from aeromycological point of view. Chenulu and Thakur (1968) reported that *Aspergillus niger* and *Rhizopus oryzae* were considered to be responsible to cause major diseases in various fruits in Delhi market. Aerobiological mycoflora were largely determined by topography, meteorological parameters, vegetation and biotic factors including human activities. The study of fungal aerospora of market may have some indications on the health of people working in the fruit and vegetable market, customers, sellers, etc. Keeping in view of the above, an attempt was made to investigate the occurrence of aeromycoflora and the incidence of diseases of these economically important fruit. Among the various pathogens *Alternaria alternata*, *Botrytis cinerea* and *Rhizopus stolonifer* are an important post harvest disease of peach and it's responsible for most losses that occur in most commercial store rooms (Spottset *al.*, 1999) found to be dominant in the store houses of local and central fruit markets of various places of

Maharashtra, particularly in Mumbai, Navi Mumbai and Kalyan (APMC Market, Kalyan) in packing boxes noted different damages of peach.

II. MATERIALS AND METHODS

The consecutive survey was carried out from August to October, 2020 and August to October, 2021. In the APMC fruit Market of Kalyan. Air samplings in the fruit market of peach at two weeks intervals using Gravity slide and Petriplate exposure methods using Czapek's Dox Agar Medium. Petriplate were exposed to the air in fruit market at different time intervals such as 0, 5, 10 and 15 minutes and at different heights i.e. 0 levels (ground level), 500cm, 1000cm and 2000cm above ground level for trapping aeromycoflora. These agar plates were incubated at (28±2)°C for 7 days. After seven days colony character, culture pattern were studied and identified different aeromycoflora using literatures. Total twenty five fungi were found in APMC fruit market Kalyan at different height and time interval were considering the study of aeromycoflora. (Sreeramulu T 1959; Asanet al., 2002; Uddin 2004).

III. RESULTS AND DISCUSSION

Total 25 fungi were trapped and observed from the air of APMC fruit market Kalyan viz. *Alternaria alternata*, *A. flavus*, *Aspergillus fumigatus*, *A. niger*, *A. tenuis*, *Botrytis cinerea*, *Curvularia lunata*, *Mucor piriformis*, *Penicillium chrysogenum*, *Penicillium citrinum*, *Penicillium commune*, *Penicillium digitatum*, *Penicillium expansum*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium regulosum*, *Penicillium solitum*, *Phytophthora actinophthora*, *Phytophthora parasitica*, *Rhizopus arrhizus*, *Rhizopus nigricans*, *Rhizopus stolonifer*, *Sclerotinia fructigena*, *Sphaeropsis pyriputrescens* and *Venturia inaequalis* using gravity slide and agar plate exposing method. Agar plates were exposed at 0, 5, 10 and 15 minutes at different levels and accordingly the mycoflora were trapped. The fungal spores settled down on agar plate at different level and at different time intervals shown in Table 1 and Table 2. *Rhizopus nigricans*, *Rhizopus arrhizus* and *Sphaeropsis pyriputrescens* were not found at the height of 2000cm. The most dominant aeromycoflora on agar plate were observed in Kalyan fruit market. *Alternaria alternata*, *Aspergillus fumigatus*, *Aspergillus flavus*, *Aspergillus niger*, *Botrytis cinerea*, *Penicillium funiculosum*, *Penicillium digitatum*, *Rhizopus stolonifer*, *Mucor piriformis* and *Penicillium expansum*. *Penicillium expansum*, *Botrytis cinerea* and *Mucor piriformis* were found serious on peach and were recorded at different height. Most of aeromycoflora *Alternaria alternata*, *A. flavus*, *Aspergillus fumigatus*, *A. niger*, *A. tenuis*, *Botrytis cinerea*, *Curvularia lunata*, *Mucor piriformis*, *Penicillium chrysogenum*, *Penicillium citrinum*, *Penicillium commune*, *Penicillium digitatum*, *Penicillium expansum*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium regulosum*, *Penicillium solitum*, *Phytophthora actinophthora*, *Phytophthora parasitica*, *Rhizopus arrhizus*, *Rhizopus nigricans*, *Rhizopus stolonifer*, *Sclerotinia fructigena*, *Sphaeropsis pyriputrescens* and *Venturia inaequalis* were observed at ground level and followed by 500, 1000 and 2000cm. Similarly aeromycoflora occurrence at different time period. The maximum number of fungi were noted at 15 minutes time intervals and followed by 10, 5 and 0 minute. Mycoflora were not settled on agar plate as compared to 15 minutes. Similar reports were illustrated by (Lim and Rohrback, 1980 and Padmanabhan et al., 1953).

Table 1: Frequency of occurrence of mycoflora at different height (cm) in the fruit market of peach

Fungi	Height (cm)			
	Ground level (0)	500	1000	2000
<i>Alternaria alternate</i>	+++	++	++	++
<i>Aspergillus flavus</i>	++++	+++	++	+
<i>Aspergillus fumigatus</i>	++++	+++	++	+
<i>Aspergillus niger</i>	++++	+++	++	+
<i>Aspergillus tenuis</i>	++++	++	++	+
<i>Botrytis cinerea</i>	++++	+++	++	++
<i>Curvularia lunata</i>	++++	+++	+	+
<i>Mucor piriformis</i>	++++	++	++	+

<i>Penicilliumchrysogenum</i>	+++	++	++	+
<i>Penicilliumcitrinum</i>	+++	++	++	+
<i>Penicillium commune</i>	+++	++	++	+
<i>Penicilliumdigitatum</i>	++++	+++	++	+
<i>Penicillium expansum</i>	++++	++	++	+
<i>Penicilliumfuniculosum</i>	++++	+++	++	+
<i>Penicilliumitalicum</i>	+++	++	++	+
<i>Penicilliumregulosum</i>	+++	++	+	+
<i>Penicilliumsolutum</i>	+++	+++	++	+
<i>Phytophthoracactorum</i>	+++	++	++	+
<i>Phytophthoraparasitica</i>	+++	++	++	+
<i>Rhizopusarrhizus</i>	+++	++	+	-
<i>Rhizopusnigricans</i>	+++	++	+	-
<i>Rhizopus. Stolonifer</i>	++++	+++	++	++
<i>Sclerotinafructigena</i>	+++	++	++	+
<i>Sphaeropsispyriputrescens</i>	+++	++	+	-
<i>Venturiainaequalis</i>	+++	++	+	+

N.B. = +: 25 per cent frequency of occurrence of fungal species; ++ : 50 per cent frequency of occurrence of fungal species; +++ : 75 per cent frequency of occurrence of fungal species; ++++ : 100 per cent frequency of occurrence of fungal species.

Table 2: Frequency of occurrence of mycoflora at different periods of exposure in the fruit market of peach.

Fungi	Different Period of exposure			
	0 minutes	5 minutes	10 minutes	15 minutes
<i>Alternariaalternata</i>	-	++	+++	++++
<i>Aspergillusflavus</i>	-	+	+++	+++
<i>Aspergillusfumigatus</i>	-	++	++	++++
<i>Aspergillusniger</i>	-	++	+++	+++
<i>Aspergillustenuis</i>	-	+	+++	+++
<i>Botrytis cinerea</i>	-	++	+++	++++
<i>Curvularialunata</i>	-	+	++	+++
<i>Mucorpiriformis</i>	-	+	++	+++
<i>Penicilliumchrysogenum</i>	-	+	++	+++
<i>Penicilliumcitrinum</i>	-	+	++	+++
<i>Penicillium commune</i>	-	+	++	+++
<i>Penicilliumdigitatum</i>	-	+	+++	++++
<i>Penicillium expansum</i>	-	++	++	+++
<i>Penicilliumfuniculosum</i>	-	+	++	+++
<i>Penicilliumitalicum</i>	-	+	++	+++
<i>Penicilliumregulosum</i>	-	+	++	+++
<i>Penicilliumsolutum</i>	-	+	++	+++
<i>Phytophthoracactorum</i>	-	+	++	+++
<i>Phytophthoraparasitica</i>	-	+	++	+++
<i>Rhizopusarrhizus</i>	-	+	++	+++
<i>Rhizopusnigricans</i>	-	+	++	+++
<i>Rhizopus. Stolonifer</i>	-	+	+++	++++
<i>Sclerotinafructigena</i>	-	+	++	+++

<i>Sphaeropsispyriputrescens</i>	-	+	++	+++
<i>Venturiainaequalis</i>	-	+	++	++

N.B. = +: 25 per cent frequency of occurrence of fungal species; ++ : 50 per cent frequency of occurrence of fungal species; +++ : 75 per cent frequency of occurrence of fungal species; ++++ : 100 per cent frequency of occurrence of fungal species.

REFERENCES

- [1]. Asan A, Sav B, Sarica S, "Airborne fungi in urban air of Edime city (Turkey)", *Biologia* Vol.57, pp. 59-68, 2002.
- [2]. Chenulu V V, Thakur D P, "Aspergillusniger and Rhizopusoryzae were considered to be responsible to cause major diseases in various fruits", *Indian Phytopath*, Vol. 4, pp. 65-70 1968.
- [3]. Lim Tong-Kwee, Rohrbach K G, "Role of Penicilliumfuniculosumsrains in development of pineapple fruit diseases. (Ecology and Epidemology)", *Indian Phytopath* Vol. 70(7), pp. 663-665, 1980.
- [4]. Medhi S, Sharma T C, "Study of onion and Ginger Store houses of Guwahati", *Assam. J. Life Sci*, Vol. 28, pp. 548-552, 2010.
- [5]. Padmanabhan S Y, Gangul D, Balkrishnan M S, "Helminthosporiumdisease of Rice II. Source and development of seedling infection", *Indian Phytopath*, Vol.5, pp. 96-105, 1953.
- [6]. Sharma T C, Bhattacharjee R N, "Occurrence of Aeromycoflora of Banana fruit market", *J. Adv. Pl. Sci*, Vol. 42, pp. 77-184, 2001.
- [7]. Spotts R A, Cervantes L A, Mielke E A, "Variability in post harvest decay among apple cultivars", *Plant Diseases*, Vol. 83, pp.1051-1054, 1999.
- [8]. Sreeramulu T, "The diurnal and seasonal periodicity of certain plant pathogen in the air", *Trans. Br. Mycol. Soc*, Vo. 42, pp. 172-184, 1959.
- [9]. Tilak S T, Kulkarni R L, Some additions to the fungal flora of the air. *Indian Phytopath*, Vol. 34, pp.69-71, 1980.
- [10]. Uddin N, "Air spore studies over a rice (high yielding variety) field in rabi season in the state of West Bengal, India", *Aerobiologia*, Vol. 20, pp.127-134, 2004.