

Investigation of insect-pest and diseases of mango from Aurangabad district (MS)

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Abstract

Results revealed that the incidence of some important pest and diseases of mango during 2018-19 and 2020-2021 in Aurangabad district of Maharashtra average incidence of mango hopper in different locations of Aurangabad district ranged from 10.13 to 12.27 hoppers per panicle with the maximum incidence 13.17 hoppers/ panicle in Paithan during 2019. The thrips incidence ranged from 7.02 to 14.16 thrips per panicle with the maximum incidence in the Sillod (13.78 thrips/panicle) during 2019. Disease incidence of mango anthracnose is highest as compared to Black mould of mango, fruit rot and mango sooty blotch and also work carried on effect of different isolation media on dry weight in mg were recorded during isolation of pathogen from infected sample. The highest dry weight of isolated pathogen found in PDA media and followed by Czpek's agar media.

Keywords: pest and diseases, incidence, prevalence, symptoms, isolation and media etc

Introduction

Mango (*Mangifera indica* L.) (Family: Anacardiaceae) originated in the Indo Burma region and has become naturalized and adapted throughout the tropics and subtropics. India has the richest collection of mango diversity with more than 1000 named varieties (Mukherjee 1997). Major mango producing countries are India, China, Thailand, Mexico, Pakistan, the Philippines, Indonesia, Brazil, Nigeria and Egypt. India ranks first and accounts for about 50% of the world's mango production with 2.5 million hectares producing annually 18.0 million tons. Insect pests are a major limiting factor in achieving full yield potential of mango varieties. About 400 species of insect pests are known to infest mango in different parts of the world (Tandon and Verghese 1985; Pena *et al.* 1998). Worldwide lists of pests of mango have been compiled by de Laroussilhe (1980), Tandon and Verghese (1985) and Veeresh (1989). Commercial cultivation of mangoes, characterized by the area expansion, changing cropping patterns, varietal replacements and increased chemical interventions, has altered the pest complex and pest community structures significantly. Several pests, diseases, and disorders have been recorded on various mango varieties, ultimately resulting in severe losses to all parts of the mango around the world. Approximately 260 pest species including major and minor pests have been recorded from seedlings to mature trees at harvest and postharvest stages.

Also, major diseases of mango are responsible for huge loss in production as well as productivity of mango in world. Some major diseases still are recorded on trees as well as fruits of mango which are soil born diseases including diseases and causal agent are anthracnose, *Colletotrichum gloeosporioides* (Penz.); powdery mildew, *Oidium mangiferae* (Bert.); malformation, *Fusarium* spp; bacterial leaf spot, *Erwinia mangiferae* (Doidge); crown gall, *Agrobacterium tumefaciens*; sooty mold, *Capnodium mangiferae*; fruit rot, *C. gloeosporioides* and *Aspergillus niger*; root rot, *Rhizoctonia solani* (Kuhn) and *F. oxysporum*

(Schl.); dieback, *Diplodia natalensis* and *Lasiodiplodia theobromae* (Pat.) Griff. and Maubl. (Syn. *Botryodiplodia theobromae* Pat.) *gummosis*, L. theobromae; and mango sudden decline, a complex disease. According to Nishar Akhtar and Abdul Majid Ansari 2019 [14], The insects are believed to be contributing nearly 26% of the loss to the cropping ecosystem. So of course, the weeds will take a major toll (33%) but the insects and the diseases (26%) are one of the major things and losses caused by rodents and others is around 15 %. It has been estimated that annually there will be around INR 60,000 crores lost due to damage by insects on various agricultural crops. However, the exact status of these pests in Aurangabad region is not known and their effect on production and productivity of mango. Therefore, a fixed plot survey was carried out from the Aurangabad region during vegetative flush and the flowering period of 2018-19 and 2020-21.

Material and methods

In present studies of survey made by mango field in Aurangabad district during years of 2018-2019 and 2020-21. Five different locations of tehsil *viz.*, Aurangabad, Sillod, Phulambri, and Paithan were selected for data collection. From each selected 10 mango trees during flowering and fruiting stage and observed panicle and fruit insects and calculated their actual incidence and prevalence in surveyed mango field by used method early ear.

Prevalence

The Prevalence of each disease was estimated by counting the number of fruit disease location with respect to total locations based on symptoms and calculated using the following formula (Tucho *et al.*, 2014).

$$\text{Diseases Prevalence (\%)} = \frac{\text{Number of locations with diseased fruits}}{\text{Total number of locations}} \times 100$$

Isolation of fungi from infected fruits

Collected mango leaf, fruits sample from suryed mango field and brought in laboratory for isolation of fungi which are serious responsible for cause diseases to trees and fruit. Fungi isolate on PDA (Potato Dextrose Agar) medium. Initially the fruit were surface sterilized with the solution of 0.1% HgCl₂. To remove the traces of HgCl₂ the fruits were washed with distilled water for 3-4 times. Then a small piece of infected region of fruit was removed with the help of sterile needle and the piece was inoculated on PDA (Potato Dextrose Agar), Czpek's agar, medium amended petriplates in sterile condition. The petriplates were incubated at room temperature 25+- 1 C 0, (Gadgile, *et. al.* 2010). Same procedure was followed for isolation of

fungus from different types of symptoms of mango fruit and isolated several post-harvest fungi.

Results and discussion

Observations

In present observation from field of mango including some insect are recorded which are the hopper, thrips, midge, shoot borer, leaf minor, mealy bug and scale insect out of them mealy is found on both panicle as well as fruits of mango and remaining found on panicles after recorded insect on mango calculate their incidence in Aurangabad district 10 insect on per panicle is converted into or is equal to 10% incidence observation mention in table no.1.

Table 1: Incidence of of different of pests in Aurangabad and their tehsil

Sr. No.	Name of Pest	Incidence of different pests in Aurangabad and their tehsil				
		Aurangabad	Sillod	Phulambri	Paithan	
1	Hopper (Per Panicle)	13.45	12.78	11.35	10.67	12.06
2	Midge	4.92	3.67	1.66	1.58	2.95
3	Mealy bug	3.36	4.12	4.54	4.23	4.06
4	Shoot borer	5.89	5.67	5.15	4.50	5.3
5	Thrips	16.66	12.62	12.81	8.12	12.55

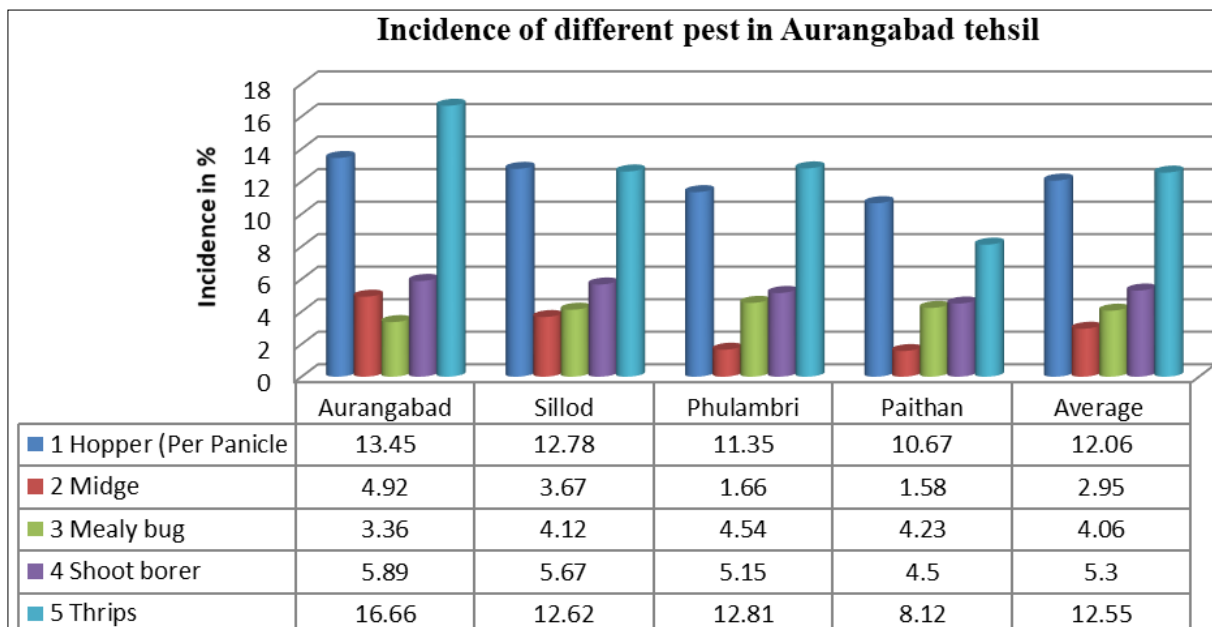


Fig 1

Results revealed that the incidence of some important pest diseases of mango during 2018-19 and 2020-2021 in Aurangabad district of Maharashtra average incidence of mango hopper in different locations of Aurangabad district ranged from 10.13 to 12.27 hoppers per panicle with the

maximum incidence 13.17 hoppers/ panicle in Paithan during 2019. The thrips incidence ranged from 7.02 to 14.16 thrips per panicle with the maximum incidence in the Sillod (13.78 thrips/panicle) during 2019(Plate No.1)





Fig 2

In above photo plate show pests and diseases of mango observed in mango field and mango fruit during survey of Post-harvest in disease of mango.

Some important severe diseases and symptoms recorded

Anthracnose

Black spots develop on infected fruits which coalesce to form large irregular blotches. Gradual increase of such black blotches covers up the entire fruit. Fruits show large deep cracks. Fungus penetrates deep into the fruit pulp. Pulp turns dark brown, Sattar & Malik, (1923); Prakash, (1979), Arauz,(2000); Nelson, (2010).

Black mould

Initially the pathogen causes light brown circular spots especially at the mother end point. The spot extend gradually in a circular manner from the stem region of the fruits to the remaining part of fruit. Spots are sunken. Spots coalesce to form large, dark brown to black patches .Mesocarp in the rotted area gets deteriorated & turns soft. Affected areas show hues conidia and conidiophores. Rao, (1966); Sumia Fatima, *et. al*, (2006); Shukla, (2009) and incidence of disease and prevalence were recorded

Fruit rot

The pathogen *Alternaria alternata* causes dark brown spots on the fruit. The spots show a distinct concentric ring. Pulp becomes dark brown below the spot. A, Samb PI, 2007; Srivastava, *et. al*, (1964); Bagwan, N.B. 2010.

Mango sooty blotch

Mango sooty blotch disease caused by *Phyllosticta capitalensis*. It is recorded as a pathogen and an endophyte from a broad range of plants. The fungi that cause them

grow on the surface of the cuticle and do not damage the fruit itself. But cause losses in commercial mango production because affected fruits are rejected in fresh market grades to much cheaper rate which causes financial loss to the mango growers and traders. As such there is no technology available in India to remove this malady of mango

Table 2: Disease incidence and diseases prevalence of mango in Aurangabad district

Disease	Incidence	Diseases Prevalence (%)
Anthracnose	31	98
Black mould	29	94
Fruit rot	26	89
Mango sooty blotch	15	28

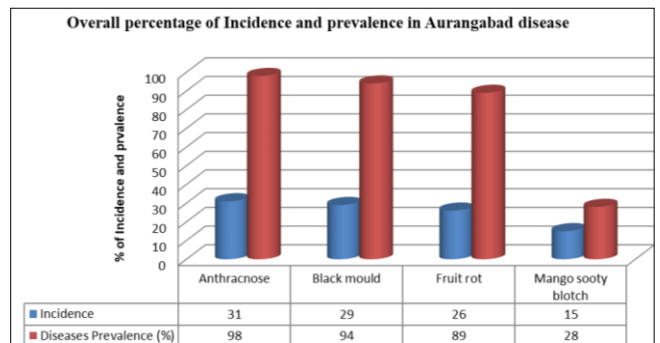
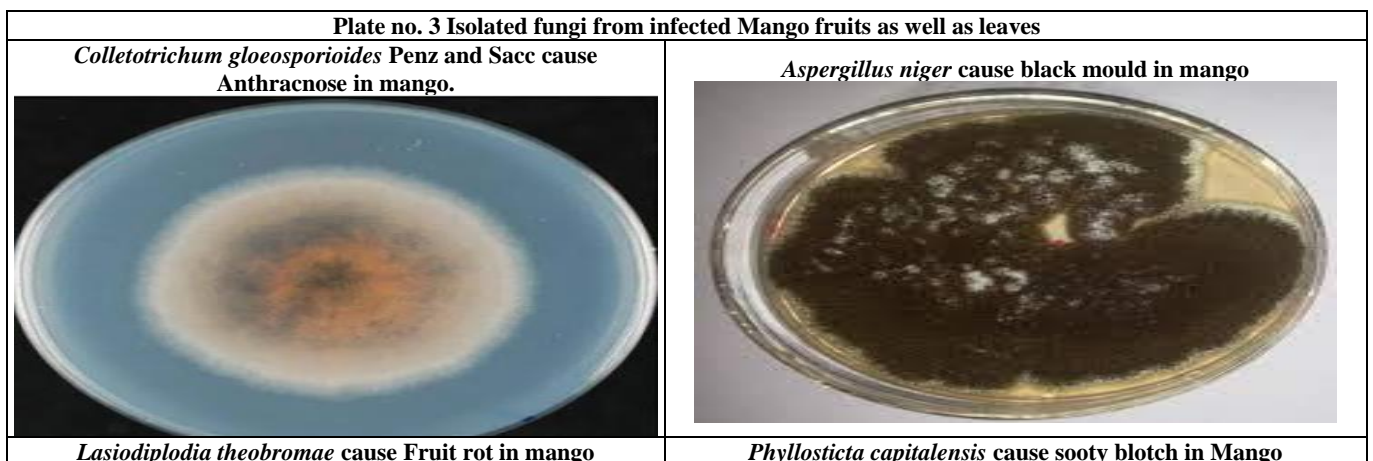


Fig 3

Disease incidence of mango anthracnose is highest as compared to Black mould of mango, fruit rot and mango sooty blotch sowing in table 2.



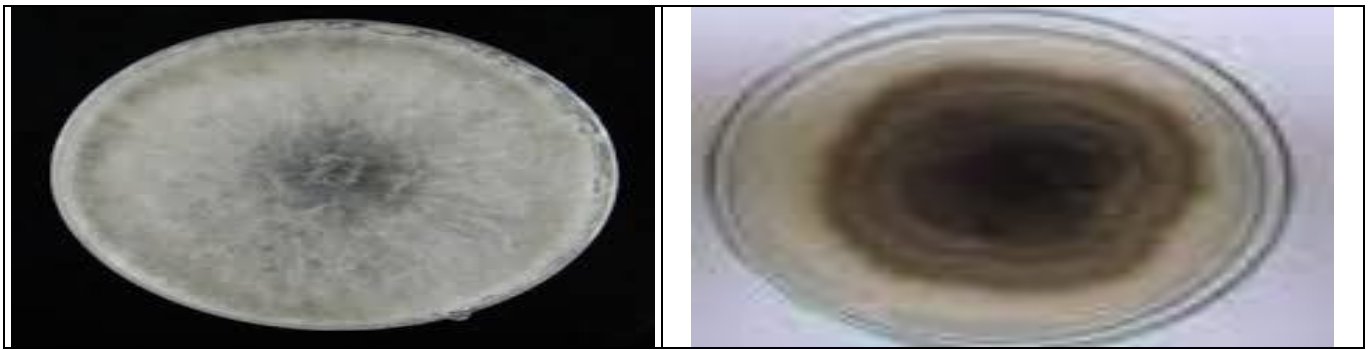


Fig 4

Photo plate 3. Showing isolated causal agents or pathogen from infected mango fruits and leaves and confirmed by morphological characteristics of pathogen growing on media.

Effect of different isolation media on dry weight in mg were recorded during isolation of pathogen from infected sample. The highest dry weight of isolated pathogen found in PDA media and followed by Czpek's agar media (Table No.3).

Table 3: Effect of different media on isolated fungi dry weight in mg on 10th days

Sr. No.	Medium Used	Dry weight in mg		
		<i>Colletotrichum gloeosporioides</i> Penz and Sacc	<i>Aspergillus niger</i>	<i>Lasiodiplodia theobromae</i>
3	Czpek's agar	81	72	89
1	Malt extract agar	79	51	72
6	Nutrient agar	21	12	41
4	PDA(potato dextrose agar)	97	99	112
5	Richards agar	59	26	96

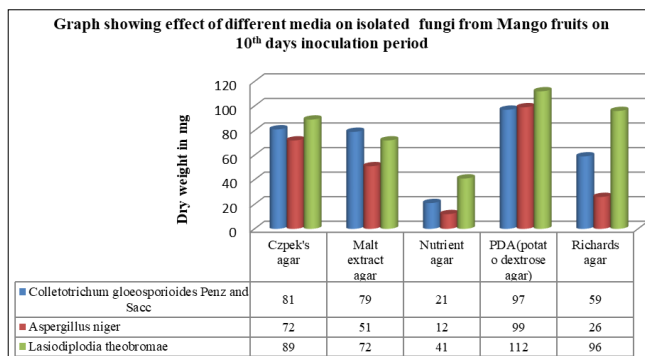


Fig 5

Conclusion

Present results showed that the mango pest and diseases are responsible for huge loss in production and productivity of mango. Multiple burdens to control of pest and disease cannot possible in and on mango field. So, it is must develop multiple disease resistance varieties of mango against pest and diseases and also this studies are helps in diagnosis of pest and diseases of mango.

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