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RESEARCH ARTICLE

Identify the major disease problems in the citrus growing area of Chhindwara district of Madhya Pradesh

■ **BHUPENDRA THAKRE, UTTAM SONI, C.L. GOUR AND S.R. DHARPURE**

SUMMARY

The experiment was conducted in commercial Nagpur mandarin orchards during year 2015-16 covering 70 orchards in 12 location/ villages of Sausar tehsil. In each orchard of Nagpur Mandarin 20 trees were randomly selected for visual observations. In recent years number of problems was observed in citrus growing area of Madhya Pradesh specially the decline of plants after the age of 7-8 year, citrus canker, sooty mould etc. In order to study the problem and try to find out their solution a Technology Mission on Citrus for Chhindwara distt. of Madhya Pradesh has been started since May 2011 at Zonal Agriculture Research Station, JNKVV, Chhindwara. Successful control of Gummosis and other disease of citrus are possible which has been demonstrated with positive result in Nagpur Mandarin Diseases.

Key Words : Citrus, Nagpur Mandarin, Citrus diseases, Disease incidence, Survey

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Citrus is one of the major cash crops for farmers in India. It is grown in 2.81 lac hectares in country. In Madhya Pradesh it is grown in 8973 hectares out of which 4854 hectares area is only in Chhindwara District. Mostly in the Sausar and Pandurna tehsil. Next to Mango and Banana, Citrus represents the third largest fruit industry of India and ranks 6th among the Citrus growing countries of the world. The principal regions of citrus cultivation in India lie in Madras, Madhya Pradesh, Maharashtra, Assam and Mysore. Citrus fruits are esteemed primarily as articles of diet. They also provide a large number of commercial products such as essential and fatty oils (orange oil, lemon oil, lime oil etc.), citric acid, malic acid, minerals (Calcium, phosphorus and iron), glycosides, pectin's, anthocyanins, E-carotine, Vitamin C & B, sucrose and other reducing sugars etc. Fruits are converted into beverages (juices, squashes etc.) and also some canned commercial products (Ullah *et al.*, 2007). Oranges are the most refreshing delicious, wholesome and growth promoting juicy fruits. Limes and lemons are rich in vitamins, minerals and salts but are

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highly acidic. Their juice is mixed with sugar for the popular summer drink "the sherbet". They are also largely used for making pickles and thus preserved throughout the year. Oils obtained from orange, lemon and lime are used for flavoring purposes and also have some medicinal properties. Citrus trees and fruits are subject to a number of diseases in the field as well as storage incited by fungi, bacteria and viruses of which the fungal diseases predominate. As a result, heavy crop losses are experienced by the orchard owners and also by the 'Fruit Canning Industries' it plays an important role in the economy of the farmers of these areas. The citrus plantation is also one of the major fruit commodities to support the household economic for small farmers, which are directed at increasing income, employment opportunities and nutritional status through high value of commercial and nutritional crop. However, orchards and plantation are being damaged by diseases and insects, especially root rot disease. One factor associated with citrus production is the most serious disease distributed worldwide, that is foot rot, brown-rot, gummosis, root rot or similar types of gum disease which are caused by either *Pythium* spp or *Phytophthora* spp. These have been reported in every country where citrus is grown (Afek and Sztefnberg, 1988).

MATERIAL AND METHODS

The study involved simple random sampling surveys for citrus diseases on Nagpur mandarin with a view to identification the distribution and occurrence of the diseases of Nagpur Mandarin. A survey was undertaking during 2015-16 covering 70 orchards in 12 location/ villages of Sausar tehsil. In each orchard of Nagpur Mandarin 20 trees were randomly selected for visual observations. Presence of oozing gum on the main trunk, on twigs, fruiting fungal bodies on drying trees/ parts with the help of Micro scope (10 X), Black mould on the ventral dorsal surface of leaves, white powdery mass on leaves, yellowing and chlorosis were recorded for gummosis, anthracnose and powdery mildew disease. General Irtting / sudden death of the tree were recorded with consultation of farmers.

RESULTS AND DISCUSSION

Survey of diseases of Nagpur Mandarin during the survey conducted in year 2015-16 flowing diseases were recorded on the basis of typical visual symptoms (Table 1).

Gummosis :

An early symptom of *Phytophthora* gummosis is sap oozing from small cracks in the infected bark, giving the tree a bleeding appearance. The gumming may be washed off during heavy rain. The bark stays firm, dries, and eventually cracks and sloughs off. Lesions spread around the circumference of the trunk, slowly girdling the tree (Babadoost and Islam, 2002).

Gummosis (incited by *Phytephthora* sp.) was present in all orchards. Minimum (49.00 %) trees infected were observed at Belgaon while minimum 6.50

Table 1 : Incidence of diseases of Nagpur mandarin in Sausar block of Chhindwara district observed during 2015-16

Sr. No.	Name of the location/ Village	No. of orchards observed	No. of plants observed	No. of plant infected					
				Name of disease					
				Gummosis	Anthracnose	Sooty mould	Powdery mildew	Wilt / Decline	
								General	Quick
1.	Khutama	05	100	36 (36.00)	21 (21.00)	04 (4.00)	00 (0.00)	20 (20.00)	03 (3.00)
2.	Ramakona	05	100	18 (18.00)	11 (11.00)	01 (1.00)	00 (0.00)	17 (17.00)	00 (0.00)
3.	Kajalvani	03	60	09 (15.00)	29 (48.33)	02 (3.33)	30 (50.00)	25 (41.60)	02 (3.30)
4.	Kuddam	01	20	02 (10.00)	00 (0.00)	00 (0.00)	00 (0.00)	01 (5.00)	00 (0.00)
5.	Sausar	16	320	14 (44.00)	70 (21.87)	51 (15.93)	00 (0.00)	75 (23.40)	00 (0.00)
6.	Belgaon	05	100	49 (49.00)	41 (41.00)	02 (2.00)	03 (3.00)	39 (39.00)	00 (0.00)
7.	Mohgaon	06	120	27 (22.50)	05 (4.16)	21 (17.50)	02 (1.60)	07 (5.84)	00 (0.00)
8.	Pandhrakedi	10	200	13 (6.50)	17 (8.50)	27 (13.50)	12 (6.00)	11 (5.50)	01 (0.50)
9.	Razhaipipla	06	120	09 (7.50)	01 (0.83)	90 (75.00)	00 (0.00)	00 (0.00)	00 (0.00)
10.	Borgaon	05	100	19 (19.00)	01 (1.00)	02 (2.00)	00 (0.00)	00 (0.00)	00 (0.00)
11.	Vaghyanla	03	60	14 (23.33)	04 (6.66)	31 (51.66)	06 (10.00)	01 (1.66)	00 (0.00)
12.	Paradsinga	05	100	22 (22.00)	13 (13.00)	05 (5.00)	00 (0.00)	01 (1.00)	00 (0.00)
		70	1400	359	213	236	53	197	6

*Figures in parenthesis are the percentage value.

% infected tree were observed at Pandhrakhedi during September to October 2015 (Gade, 2012). In total 12 locations selected 359 trees showed the infection out of 1400 thus amounting to 25.64 % infected tree from Gummosis due to *Phytephthora* sp. Thus it has been identified as a major problem of this zone. The ill effects on the trees on account of Gummosis infection resulting into steamed barking at oozing point (after gum drying) rot of feeder (surface) roots, discoloration of infected roots and typical drying of twinges from the tip (Babadoost and Islam, 2002). Maximum disease incidence was noted in September; in this month oozing of gum has been recorded on the main trunk (upto 4 feet height) as well as 10 – 12 feet on the twinges. At Kajalvani village a maximum (23.33 %) trees exhibition the oozing on twigs. While minimum infection (1.66 %) trees were observed at Razadipipla and Vaghyanala. Disease severity mass maximum in November. Average 7.14 per cent trees exhibited the oozing symptoms during survey in Sausar tehsil.

Anthracnose :

It causes dark, sunken lesions on leaves, stems, flowers, and fruits. It also attacks developing shoots and expanding leaves. It can spread very quickly during rainy seasons. Anthracnose is a general term for a variety of diseases that affect plants in similar ways. Anthracnose is especially known for the damage that it can cause to trees. Anthracnose is caused by a fungus. Anthracnose can survive on infected plant debris and is very easily spread. Like rust, it thrives under moist and warm conditions and is often spread by watering (Ullah *et al.,* 2007).

There were a drying and dead twigs /tips due to colonization of *colletotricum* sp. Where the fruiting bodies were embedded in and with black mass and acervuli appeared as black dots. The drying of twigs starts from the tip and proceed downward. Maximum (48.33 %) trees showed the colonization of anthracnose fungus at Kajalvani while minimum (1.10 % and 4.16 %) at village Borgaon and Mohgaon respectively. Overall 213 trees showed the infection out of 1400 trees (average 15.21 %). The disease was recorded at eleven locations.

Powdery mildew :

Citrus powdery mildew is a fungal disease that causes leaf and shoots distortion, premature leaf and fruit drop, and twig and branch dieback. Severe infection can significantly reduce tree productivity, fruit quality and yield. The disease can also be a major problem in citrus nurseries. It has been reported to cause serious damage to Nagpur mandarin (Paine *et al.,* 2007).

Presence of white powdery mass on the leaves of fungal nature is the main symptom and the disease has been observed maximum in post – rains (October). Powdery Mildew had been recorded at 5 locations; maximum 50.00 per cent leaves exhibited the association of fungus at Kajalvani during October / November 2015. On old leaves where as at Mohgaon the disease was recorded on young leaves on 1.6 per cent trees.

Sooty mold :

Sooty mold is the common name applied to several species of fungi that grow on honeydew secretions on plant parts and other surfaces. The fungi's dark, threadlike growth (mycelium) gives plants or other substrates the appearance of being covered with a layer of soot. Sooty molds don't infect plants but grow on surfaces where honeydew deposits accumulate. Honeydew is a sweet, sticky liquid that plant-sucking insects excrete as they ingest large quantities of sap from a plant. Because the insect can't completely utilize all the nutrients in this large volume of fluid, it assimilates what it needs and excretes the rest as "honeydew." Wherever honeydew lands-e.g., leaves, twigs, fruit, yard furniture, concrete, sidewalks, or statuary-sooty molds can become established (Gibson, 1953).

Wilt / Citrus decline :

It is common symptom or name of disease, especially of woody plants, characterized by progressive death of twigs, branches, shoots, or roots, starting at the tips. Stagehand is a slow dieback of the upper branches of a tree; the dead, leafless limbs superficially resemble a stag's head. Dieback and stagehand are caused by many fungi (El–Mohamedy *et al.,* 2012).

It is the most wide spread severe problem in citrus orchards of Sausar and typical drying of twigs partial death of the tree or death of the plant proceeding downward and appearance of sickly look from the long distance had been the criteria of this problem. In general wilt was maximum in 12-15 year old orchards. Upon consultation and discussion with the farmers (Orchard growers) several reasons have been identified responsible for this wilt / decline which include – Malnutrition

(insufficient fertilizer application) management and water stress condition. The Prolonged stress condition exposes the roots to termite infection which provide direct entry to the soil – borne fungi. Maximum wilting was observed at Kajalvani and Belgaon (41.60 % and 39.00 %) trees exhibited symptoms (Fraser, 1966).

Quick wilt :

Death of the plants after attaining the age of 4-6 year expoused to sudden death. This type of death of the tree was recorded at Khutama (3.0 %) and the Kajalwani (3.3 %). At Khutama, in Quick wilt affected garden 36.00 per cent trees showed the gummosis problem too (Capoor, 1963 and El-Mohamedy, 1998).

Conclusion :

With a view to identification and studies on the distribution of citrus disease a survey was conducted in seventy orchards covering twelve villages / location of Sausar tehsil in chhindwara district during 2015-16.Feeder root rot and gummosis on the main trunk of citrus plants (incited by *Phytophthrora* sp.). The Present Study indicate that Severity of citrus diseases like Gummosis was high in November 2015 and Powdery mildew was high in post rain (October, 2015). Successful control of Gummosis and other diseases of citrus are possible which has been demonstrated with positive result in Nagpur Mandarin orchards.

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