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NEW RECORDS OF PLANT BACTERIAL DISEASES FROM INDIA

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During the survey of bacterial diseases of fruit plants present in the precincts of Aurangabad, two diseases were found new to India. They are: Leaf necrosis of Ramphal (*Annona reticulata* L.) caused by *Xanthomonas* sp. Dowson and Bacterial fruit blotch of watermelon (*Citrullus lanatus* L.) caused by *Acidovorax avenae* subsp. *citrulli*.

Keywords: *Acidovorax avenae* subsp. *citrulli;* Ramphal; Watermelon; *Xanthomonas*.

Fruit crops are affected by a number of bacterial diseases, in addition to various other diseases. These diseases under favorable conditions can cause extensive yield loss in terms of quality and quantity. Studies on bacterial diseases of fruits were not given deserving importance in the past as compared to those by fungi, viruses and mycoplasmas[1]. A complete record of disease symptoms is the starting point of correct diagnosis. Accurate identification of host and pathogen is also essential. Hence, during the study of bacterial diseases these things were taken into consideration. During the survey of plant bacterial diseases, undertaken from 2003-2007, in the precincts of Aurangabad, the authors observed for the first time two bacterial diseases new to India.

Fruit trees in the orchards of elsewhere were visited periodically and the disease samples were collected. The infected leaves or fruits were washed with running tap water. The bacterial pathogen was isolated as per the method described by Deshpande and Papdiwal[2]. The infected spots, together with the healthy parts, were cut with a sterile blade. The infected plant part pieces were then placed in sterile cavity blocks and cut to ooze bacteria in the sterile distilled water. Twenty ml of the NA medium at 45°C was poured and solidified in petridishes (9 cm size). The bacterial suspension was streaked out with a sterile wire loop on to the agar plate. Laminar flow was used for this purpose. After 48 hrs of incubation at 30±2°C; the developed colonies were transferred to agar slopes and maintained as pure cultures. The pathogenecity of the isolates was confirmed by adopting Koch's postulates[3].

1. Leaf necrosis of Ramphal (Annona reticulata L.)

Severe leaf necrosis of *Annona reticulata* was observed mainly during winter season. Leaves were found severely affected by the pathogen. Local lesions were mostly starting from the leaf margins. These lesions were irregular, spreading, dark brown in color with yellow margin and raised on dorsal surface. Afterwards, it spreads and occupy most of the area of leaf lamina. These symptoms result in chlorosis which is followed by defoliation.

The pathogen : The bacterium isolated from the lesion was short rod, having dimensions as 0.2 – 0.8 X 0.6 – 2.0 µm, gram negative, non acid fast and non-spore former. Colonies on nutrient agar were small, circular, flat, smooth and yellow. Growth at moderate rate on nutrient agar.

Acid was produced from glucose without producing gas. Gelatin liquefied rather slowly but starch and casein were hydrolyzed rapidly, nitrites not produced from nitrates, ammonia produced, indole not produced, H_2S produced, catalase test was positive. Therefore, the bacterium was identified as a species of *Xanthomonas*. As there is no report of this disease in literature, it appears to be the first report of bacterial leaf necrosis of *A. reticulata*.

2. Bacterial fruit blotch of Watermelon (Citrullus lanatus L.)

Symptoms of bacterial fruit blotch (BFB) were observed on the seedlings, mature leaves and fruits. Seedlings showed water-soaked, oily areas with yellow halo on the underside of the leaves. The infected areas dry up and become elongated, and later black necrotic patches were developed. Leaf lesions were significant reservoirs of bacteria for fruit infection. The lesions tend to be small, dark and angled.

Developing fruits were found infected by the spreading bacteria from leaf lesions. Infection of fruit

occurs at flowering and early fruit set. The diagnostic symptom of BFB was a dark green stain or blotch on the upper surface of the developing fruit. The brownish colored blotch may be 1 cm in diameter at first, but rapidly extent to cover a large area on the fruit surface. The bacterial infection does not extend into the meat of the melon, but will cause the rind to rupture, enabling infection by secondary pathogens that cause the fruit rot.

The pathogen : The bacterium was rod shaped, 0.7 – 0.8 X 1.2 – 2.5 µm in size, gram negative, non-spore former and non acid fast. On nutrient agar smooth, elevated and creamy white colored colonies were formed.

Acid, but no gas, was produced from glucose. Gelatin, starch and casein were not hydrolyzed, does not show denitrification, ammonia produced, indole and H_2S was not produced, catalase test was positive.

Bacterial fruit blotch of *C. lanatus* is known to be caused by *Acidovorax avenae* subsp. *citrulli* (Schaad, Sowell, Goth, Colwell and Webb, 1978) Willems, Goor, Thielemans, Gillis, Kersters & Deley, 1992 (formarly *Pseudomonas pseudoalcaligenes* subsp. *citrulli*). This bacterial disease has been reported on fruits of Watermelon (*Citrullus lanatus*) from Florida and other South-Eastern, Mid-Atlantic and Mid-Western states of America[4-6]. It has also been reported from China[7] and Turkey[8].

In the absence of its report in literature, the present observation of the occurrence of the disease at Aurangabad appears to be the first report from India. As severe infection of the disease is observed on the fruits, it is felt that an urgent attention is to be paid for its management.

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