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Survey, Isolation and Confirmation of Bacterial Black Rot disease in cabbage in the tribal populated area of Kanke block under Ranchi district of Jharkhand state.

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ABSTRACT

Black rot has been a main disease constraint of cabbage grown by farmers in Ranchi. Cabbage is popular cultivars of the species (*Brassica oleracia*) belong to Cruciferae family. The family cruciferae also includes tomato, cauliflower, beans, broccoli, radish, turnip and pepper. In plain area it is grown mainly as a winter crop, whereas in the hilly areas it is grown as a spring and early summer crop. Cabbage is one of the common and most popular winter vegetables grown in India. In Jharkhand the cabbage is grown almost whole year except in the months when temperature rises up to 40-45 degree Celsius. The purpose of this work was to survey, culturing of isolate from cabbage and confirming the severity of Black rot disease in cabbage in the tribal populated area of Kanke block under Ranchi district of Jharkhand state. In morphology and growth characteristics the all the three isolate resemble those describe by Patel *et.al.*(1949) and Pandey (1980).It is evident from this the isolates of New Zealand and three local isolates of cabbage were morphologically alike being short rod with rounded ends. They are Gram negative and show positive KOH solubility. On the basis of the possession of many phenotypic properties the three cabbage isolates have been tentatively assigned to this pathogen *Xanthomonas campestris pv. Campestris (Xcc)*.

Keywords : Cabbage, disease, *Brassica*, *Xanthomonas campestris*

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INTRODUCTION

Black rot disease caused by *Xanthomonas campestris pv. Campestris (Xcc)* is a common and sometime Cabbage production can be affected by biotic and abiotic factors, including disease and pests, climatic and soil conditions, crop management, etc. serious disease of plant belonging to the cabbage family and it is a serious disease for India(William).

The study area for this research work was Kanke. Kanke is a block of Ranchi district of Jharkhand state. It is located 11 km away from Ranchi district headquarter. Kanke block consist of 193 villages and 37 Panchayat. Hindi is local language but people also speak Urdu, Mundari, Kurukh etc. The villagers of Pithoria, Bargain and Boreya are mainly depending upon the cultivation of vegetable crops. They grow vegetables like cabbage, tomato, cauliflower, beans, radish, turnip and capsicum etc. and sell their vegetables at Ranchi town market and outside Ranchi.

The purpose of this research work was to survey, culturing of isolate from cabbage and confirming the severity of Black rot disease in cabbage in the tribal populated area of Kanke block under Ranchi district of Jharkhand state.

MATERIALS AND METHOD

Survey

In this research work survey was conducted in cabbage fields of Pithoria, Bargain and Boreya villages and the symptom of Black rot disease was observed . The survey work was also performed in six other filed's like Hochar, Gagi, Bukru, Barhu, Patratoli and Arsande. The photograph of cabbage growing field as well as symptom of infected cabbage for preparation of the symptomatology chart with digital documentation and digital herbarium . The samples of infected cabbage leaf were collected and kept in polythene bag for the isolation of the bacterial pathogens was made on the same day.

Identification

Initially symptoms are irregular, dull, yellow blotches appears on edge of leaves. The disease is easily recognized on the most of cabbage by presence of yellow 'V' or 'U' shaped area extending in word from the margin of leaf. As the disease progresses , yellow lesion turn brown and narcotic . Within the affected part of leaf areas, the midrib of leaf turns black and vein became darken in colour. The vein discoloration progresses towards the base of the leaf as the bacteria spread throughout the leaf veins into the stem, forming to a net like pattern.

When infected stem are cut in cross section, a black vascular ring may be evident where the bacteria moved into the water conducting vessels or tissues. At this point , affected plants tend to

show symptom of wilting. The discoloration extends from the stem to the upper leaves and down into the root.

The lower leaves of infected plant are usually stunted, yellow to brown, and wilted and often drop prematurely. Infected plant may consist of a long, base stalk topped with a tuft of leaves. Infected cabbage head really reach full size. Plant may quickly rot immediately before or after harvest, due to secondary soft rotting bacteria.

Culturing the Isolates from Cabbage

An isolate was prepared from the infected leaves of the cabbage collected from the Kanke block fields. A surface sterilized inoculation chamber was used for performing the isolation experiment. The infected leaves of the cabbage having brown and necrotic area of infected lesion, a prominent disease symptom, were surface sterilized by washing with 0.01% mercuric chloride solution twice and later by repeated washing with sterilized distilled water.

The infected portions of leaves having matured symptoms were cut into small pieces. Each piece was then transferred with the help of sterilized inoculation needle into autoclaved test tubes and petriplates containing different media like SPA, GYCA, NDA, PDA and synthetic medium. The test tubes and petriplates were placed in incubator at 22 degree Celsius. After 24h and 48h of incubation period some yellowish substances come out around the pieces of the leaves in culture medium. This growth was inoculated into fresh autoclaved culture tube and repeated re-inoculation was done. These were the isolated cultures.

The isolated cultures were treated with the healthy leaves of the potted cabbage. This was done in accordance with the Koch's postulates.

Gram Staining

The Gram staining was done to determine whether the bacterium is Gram positive or Gram negative. The procedure followed was based on Skerman (1967). Blue colour indicated Gram positive. Here the crystal violet stain was absorbed. Red colour indicated Gram negative. Here the bacterial cell wall failed to retain the crystal violet stain after decolorization. Instead the safranin stain was taken up.

KOH solubility test

The procedure followed was that of RYU. The suitability and authenticity of this test has been confirmed by Gregersen and Suslow. This test was done to reaffirm the results of Gram staining.

When the KOH solution became viscous while raising the loop a thread of slime follows for 0.5-2 cm distance or more. This positive reaction is for gram negative bacteria. However, if there is no

slime and instead a watery suspension that does not follow the loop, the reaction is taken as negative and confirmatory for Gram positive bacteria.

RESULTS AND DISCUSSION

In order to establish the identity of the bacterium isolated from locally grown cabbage leaves, a set of test were carried out. All the local isolate and authentic isolate obtained from PDDCC, Auckland, New Zealand was compared with each other for morphological features such as shape, size, Gram reaction and KOH solubility. In Gram staining the bacterial cell wall failed to retain the crystal violet stain after depolarization . Instead the safranine stain was taken up.

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