

STUDIES ON BROWN ROT OF POTATO
IN EGYPT

By

NABIL SOBHEY FARAG

B.Sc. (Agric.)

Ain Shams Univ., 1963.

Thesis

Submitted as a partial fulfilment of
the requirements for the degree of
M.Sc. in Agric. Bacteriology



University of Ain Shams
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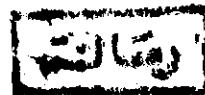
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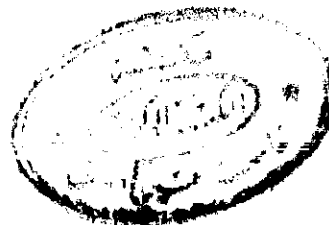
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TO Whom I am deeply

Indebted

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I N T R O D U C T I O N

Potato is considered one of the most important vegetable crops in U.A.R. According to the central Agency of Public Mobilization and Statistics (1965) the area cultivated with potato reached 58, 60 and 55 thousand feddans in the years 1962, 1963 and 1964 respectively. The respective production in these years was 355, 421 and 376 thousand tons. Besides, potato exportation represents an important source of foreign currency reaching 1.5 millions L.E. in the year 1964.

The importance of potato in both local consumption and exportation makes it necessary to study all factors influencing its production and quality.

Potato is cultivated in U.A.R. in two seasons, namely the summer and Nili seasons. The summer one is mainly cultivated with imported certified tubers carefully inspected against fungal, viral and bacterial diseases, while the Nili is cultivated with local tubers. Thus the yield and quality of the summer production is usually satisfactory. Extensive efforts are made to produce high quality tuber for cultivation of potato in Nili season.

Moreover, production of potato crop free from diseases is highly important from the **exportation** point of view, since any sign of brown rot disease in exported potato results in its rejection.

Brown rot disease is considered one of the serious diseases of potato that greatly affect its yield and quality. This disease is well known to cause wilt and death of plants. Those which are able to overcome the infection or have developed the disease late, produce diseased tubers. The latter show the unmistakable characteristic ooze with or without brown discoloration of vascular bundles. Such crop usually gives tubers which might be a serious source of infection in the following season.

Therefore, it was found of great importance to make an extensive study on this disease. A survey of the spread of the disease in U.A.R. was of importance to make. Again, several strains of the causal organism were isolated. They were tested for morphological, cultural, physiological and pathological characteristics. The host range of these isolated organisms was determined. The variation between the susceptibility of the commercial potato

varieties, cultivated in U.A.R. was also investigated. The effect of different fertilizers either single or in combinations together with organic manure on disease severity, plant growth and yield was carried out. In addition, the effects of seed-piece weight and suberization on disease development were investigated.

REVIEW OF LITERATURE

Prior to the latter part of nineteenth century, little was known about the bacterial wilt disease of solanaceous plants. This may be due to the limited acreage cultivated with the susceptible hosts such as potato, tomato and tobacco, specially in warm temperate regions of the world at that time.

The disease was first observed in about 80 places of the world at the same time, therefore, it was difficult to find out the suspected region in which it had been originated.

In Japan records indicated that the disease was recognized as a problem for tobacco production early in 1881 (Uyeda, 1905). In an old Japanese book written in 1633, the occurrence of a wilt disease called "neguchi" was reported in Hitachi, Kazuke and Schimozuke tobacco districts, thus it is possible that the earliest record of the disease may have been made in Japan.

In Europe Comes (1884) represented an early report about the wilt disease of tomato in the vicinity of Naples,

but Smith (1914) failed to find any diseased tomato plant affected with Pseudomonas solanacearum in the same place. However, in recent years the disease has been reported in Italy, and there is a possibility that Comes's report concerning the disease in Naples was correct (Kelman, 1953).

In Granville county , North Carolina, the losses due to the bacterial wilt disease in tobacco had been increased; according to the farmers observations in the area between Neuse and Tar rivers. Stevens (1904) stated that the disease was first observed in 1881 on one farm near Hester. At that time it was not known that the causative agent of the wilt disease of tobacco is the same as tomato. Later on, it was known that the disease on tomato was already widespread in North Carolina for many years. Burill (1890-1891) was probably the first worker to make pure cultures of the bacterium and examine its pathogenicity in the United States.

In Mississippi, Halsted (1892 a, 1892 b) was the first to investigate the wilt disease of tomato in that state.

In Java, the disease on peanut was of minor importance prior to 1890, but when peanut became marketable in China and widely cultivated, the bacterial wilt became a major problem (Van Breda de Haan, 1906).

In Indonesia, Janes (1892) and Van Breda de Haan (1897) reported the occurrence of the wilt disease on tobacco. Apparently, losses had occurred prior to that time; since Honing (1914) mentioned a Deli tobacco grower who had lost an entire field due to "Slime disease" about 1864.

In Queensland and Australia, Tryon (1894) observed the disease on potato.

In Carribean region, Rorer (1911) mentioned the presence of the "Moko" disease of banana.

In British Guiana, Schomburgk (1922) observed a banana disease on Wakenman island, and suggested that the causative agent may be a parasitic mold. Martyn (1934) described the Schomburgk's disease as the "Moko" disease of banana caused by P. solanacearum.

In Egypt, Briton-Jones (1925) recorded the disease on potato at Gemmieza. However, Sabet (1961) made the first authentic work. Zietoun (1961) has isolated P. solanacearum from Egyptian potato tubers showing the internal symptoms of the disease. Gehring (1962) in Germany has isolated the organism from potatoes imported from Egypt. Lelliott (1964) in England mentioned that the brown rot was widespread in Egypt.