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Major Fungal and Bacterial Diseases of Potato and their Management

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ABSTRACT : Potato is an important crop which holds promise for food to millions of people especially in developing countries. Full potential of the crop can be realized only if diseases that affect the crop are kept under control. Major fungal diseases such as late blight, early blight, black scurf, fusarial wilt/dry rot, wart, powdery scab, charcoal rot and major bacterial diseases like soft rot, common scab, bacterial wilt and brown rot cause considerable loss to potato production in field and otherwise. Diseases such as late blight, early blight, fusarial wilt and black leg primarily affect the crop/foliage where as diseases such as black scurf, wart, powdery scab and common scab disfigure the tubers and reduce their market value. Some tuber diseases such as dry rots appear mostly in storage while others such as soft rot affect potato tubers at every stage *i.e.* in field, storage and in the transit and may cause substantial loss under certain conditions. Major fungal and bacterial diseases affecting potato crop are reviewed here with respect to their identifiation, symptoms on potato plants or tubers, nature of the pathogen involved, epidemiology, control measures *etc*.

1. Introduction

Potato is a major food crop after wheat, rice and maize. Over next three decades when the world population is expected to grow by around 100 million a year and put further pressure on land, water and other resources, farmers in developing countries have to double their output to feed the growing numbers (Zandstra, 2000). In that scenario, potato holds promise for food to millions of people especially in developing countries. Full potential of the crop can be realized only if diseases and pests are kept under control. Potato crop can be affected by approximately 160 diseases and disorders of which 50 are caused by fungi, 10 by bacteria, 40 by viruses and others by non parasitic, or due to unknown causes. Diseases may affect potato at any stage of

crop growth or even during storage. They may affect foliage, tubers or both. Environment favouring pathogens can ruin the crop. The fallouts of historical potato famine in Europe particularly in Ireland caused by late blight have been well documented (Woodham- Smith, 1962). Tuber diseases like common scab, black scurf, dry rots, soft rot may not destroy the crop but can greatly reduce quality and marketability of the crop. With the introduction of resistant varieties and improved cultural practices, the disease scenario may change from time to time which require periodic surveillance (Khurana, 1998; Khurana *et al.*, 1998). Diseases may also be affected by any change in environment such as global warming (Kankoranta, 1996). Reviews on fungal and bacterial diseases in Indian context are available (Khurana, *et al.* 1999; Shekhawat *et al.* 1999; Singh and Hegde, 1999; Verma and Sharma, 1999). The present review incorporates up-to-date information on developments that have taken place both in India and elsewhere. Information is arranged under headings : symptoms, pathogen, epidemiology and control for each of important fungal and bacterial diseases. The information can be used in better management of the crop.

2.   Fungal Diseases

Major fungal diseases, which affect potato crop are late blight, early blight, black scurf, dry rots, wart, powdery scab and charcoal rots. Brief description and control measures for each of these diseases is discussed.

2.1 Late Blight

Late blight is the most dreaded disease of potato world over. It cuts global potato production by around 15 %. Overall annual cost of late blight in developing countries alone is estimated at $ 3.25 billions (Mackin, 1998). A comprehensive survey conducted to estimate the impact of late blight on potato yield, storage losses and fungicide use in the United States revealed that the fungicides cost $ 77.1 million and loss to revenue was an additional $ 210.7 millions. Cost to manage