CULTIVAR RESPONSE TO BACTERIAL RING ROT INFECTION IN MAINE

F.E. Manzer and A.R. McKenzie

Abstract

An account of several years of testing cultivars for response to bacterial ring rot (BRR) infection is reported. Inoculum was prepared by grinding infected tuber tissue and adding distilled water to make a slurry. Seedpieces of cultivars to be tested were dipped in the slurry, planted and covered immediately in the field. Five hill plots were arranged in a RCB design with four replications and cultivars of known reaction to BRR were included as checks. Assessment of symptom expressions was begun when symptoms were first observed in any entry and repeated weekly for the remainder of the growing season. Results of tests on named cultivars and a few advanced, numbered selections are presented for the years 1983 through 1986.

Compendio

Se presenta un informe de varios años de pruebas con cultivos para observar su respuesta a la infección bacteriana de la pudrición en anillo (Corynebacterium sepedonicum). El inóculo fue preparado triturando tejidos de tubérculos infectados y agregando agua destilada para formar una suspensión. Pedazos de tubérculos-semillas de los cultivares tivares a probarse se sumergieron en la suspensión, se sembraron y se taparon inmediatamente en el campo. Parcelas de cinco hoyos fueron dispuestas en bloques completos al azar con cuatro repeticiones, incluyendo como testigos a los cultivares de reacción conocida a la pudrición en anillo. La determinación de los síntomas se inició cuando éstos fueron observados por primera vez en cualquiera de las entradas y se repitió semanalmente en todo el resto de la temporada. Se dan los resultados de las pruebas sobre los cultivares nominados, y unas cuantas selecciones avanzadas numeradas, para los años 1983 a 1986.

Introduction

Bacterial ring rot (BRR) caused by Corynebacterium sepedonicum (Spieck. & Kotth.) Skapt. & Burkh., is the disease that causes greatest concern among seed growers in all seed-producing areas of the U.S. and Canada.
Because of the zero-tolerance regulations in all of these areas, the disease seldom causes substantial, direct crop losses. Nevertheless, loss of present and future seed sales can mean financial disaster to individual growers. Seed growers must therefore make every effort to keep their farms free of BRR. The most important way to ensure this freedom is to avoid seed lots that may carry the disease. Early detection of BRR is thus the most critical part of any successful seed improvement program.

Detection of BRR in the field by skilled seed potato inspectors requires good conditions for symptom development together with specific knowledge of the history of the fields inspected and seed used for planting. There are several instances of inspectors, who suspected BRR infection because of historical knowledge, finding single plants with symptoms in fields of up to 30 hectares (McKenzie, unpublished). However, it has been estimated that symptom levels below 0.1 to 0.01% may not be detected during routine inspections (6). This means that BRR infections in cultivars which do not show clearly-defined, typical symptom development, could remain undetected for several years.

At the present time, immunity to bacterial ring rot in potato is unknown (3). However, several cultivars have been developed that exhibit resistance to infection such as Teton, Saranac and Merrimack (1, 7, 9, 10). Bonde, et al. (2) stated that resistance to this disease in cv. President was transmitted to nearly half of the progeny in a cross with the susceptible cv. Katahdin. They also showed that, even in crosses of two susceptible parents, various degrees of resistance and susceptibility were found. This suggests that variable reactions to BRR infection could appear in any breeding program. Such variation could seriously hamper early disease detection.

Recent discovery of resistance to BRR symptom expression in cv. BelRus presents another potential deterrent to early detection of the disease (4). Further study of this reaction showed that BelRus is apparently as susceptible to BRR as is Katahdin (5). In addition, although typical BRR symptoms in BelRus tubers have never been observed, infected tubers can transmit the disease as readily as can infected Katahdin or Kennebec tubers (Manzer & McKenzie, unpublished). Little is presently known regarding the inheritance of factors which inhibit BRR symptom expression. Therefore it is especially important to be familiar with the BRR reaction of every cultivar, new or old.

Since symptom expression can vary with season and location, BRR-screening evaluations should be conducted in representative locations where seed of a given cultivar is to be grown (11). Furthermore, any cultivar that does not show clear symptoms prior to the normal vine-killing period should be reevaluated in one or two additional seasons. All cultivars in which the presence of BRR can not be readily and clearly determined represent a serious threat to the potato industry as potential symptomless carriers of the disease. In this report we summarize several years of testing.