EFFECT OF SEED PRODUCTION LOCATION ON THE PERFORMANCE OF RUSSET BURBANK CLONES IN SOUTHERN AUSTRALIA

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Abstract

In this study, three clones of Russet Burbank were grown at five different seed production sites and one other clone was grown at three of these sites. Seed from these treatments was then evaluated at two commercial production sites, in Victoria and Tasmania. Production site had a significant effect on the subsequent performance. Plant establishment, vigor, maturity, and stem and tuber number per plant were influenced by seed production site. Seed from more southerly locations had increased plant emergence, greater early vigor, earlier maturity, and reduced stem and tuber numbers per plant. Differences between the Tasmanian, Ruen and Victorian Netted Gem clones were small and restricted to the numbers of stems and tubers produced, and some yield components. The Ballarat clone was late maturing and had a high total but low marketable yield due to high levels of oversized and misshapen tubers. However this clone also showed least dark end to the fried crisp. Interactions were detected between clone and seed production site but these have no practical significance.

Introduction

Russet Burbank is the predominant cultivar grown in southern Australia for processing as French fries.

The performance of certified seed potatoes can differ according to their seed production location. These differences in performance can be due to factors other than disease levels such as physiological age (Grice, 1988). However according to classical definition physiological aging does not occur in tubers until after dormancy break (Wurr, 1980; O'Brien and Allen, 1981).

Seed potatoes of Arran Pilot grown at three locations in Scotland with a maximum latitude difference of 5°11', were found to have no differences in performance (Goodwin et al., 1966). Plants grown from seed produced in Saskatchewan had superior yields compared to seed produced in the USA and were more vigorous, maintained a higher leaf area index and matured later (Wahab et al., 1990).

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ADDITIONAL KEY WORDS: Russet Burbank, seed production location, Australia.
It is known that variation exists between clones of Russet Burbank especially in emergence time, stem number per plant, disease reaction, yield and hollow-heart susceptibility (Love et al., 1992).

Evaluation of several Russet Burbank clones (Beattie, 1990) resulted in the selection of the Vancouver clone for commercial use in Tasmania (now called the Tasmanian clone). In Victoria the Ruen (ex Idaho) and Netted Gem clones were selected for commercial use. A recent field selected clone (probably a giant-hill mutant) called Ballarat Burbank has been used on a relatively small scale in Victoria from non-certified seed. However, no work has been done on the effect of location of seed production on field performance of the Russet Burbank clones in Australia.

Materials and Methods

Location of Seed Production Treatments

Certified seed tubers of Tasmanian, Ruen and Victorian Netted Gem clones of Russet Burbank were produced from the same Mother seed at Wilmot (41° 20'S, 300 m/asl), Trowutta (41° 05'S, 180 m/asl) and Forthside (41° 12'S, 120 m/asl) in the state of Tasmania and at Colac (38° 32'S, 100 m/asl) and Ballarat (37° 30'S, 450 m/asl) in the state of Victoria. Average November to May rainfall for these sites is 520, 530, 295, 360 and 255 mm respectively. Mean maximum/minimum January temperatures for each site are 18/6, 20/12, 19/10, 20/12 and 26/11°C respectively. The planting/harvest dates at each site were 13 November/16 April, 28 November/27 April, 21 November/7 May, 6 December/16 May and 11 November/11 May respectively. Seed of Ballarat Burbank was only grown at Forthside, Colac and Ballarat.

All seed produced exceeded Tasmanian and Victorian seed potato certification standards for tuber quality which requires that after crop and tuber inspection it has no more than 2.5 percent of most common fungal, viral or bacterial diseases and meets defined size specifications. After the seed was grown to maturity at each location it was harvested and to minimize physiological aging was immediately placed at 4°C with high relative humidity and stored at the same location until the end of October. The seed was transported to each evaluation site and was cut, cured for a few days and planted.

Evaluation Trials

Trials were conducted in Tasmania and Victoria representing two different but relevant environments for testing the seed stocks. At both sites approximately 50g cut seed pieces were planted in double rows. Plots of 32 plants were planted on 30 October 1990 in Tasmania and 28 plants on 7 November in Victoria. Fertilizer in kg/ha of N:P:K was 121:132:209 in Tasmania and 75:235:131 in Victoria. Seed pieces were 300mm apart in 810mm wide rows in Tasmania and 350mm apart in 850mm wide rows in Victoria. There were six replicates at each evaluation site.