

### Abstract:

Release of new potato cultivars for grower production should be concurrent with cultural and storage recommendations to optimize economic returns. Estimation of tuber dormancy also raises an awareness for the need to have a rapid method to predict the stage of dormancy. This study characterized storage potential for several advanced selections and new potato cultivars by quantifying the number of days to 10 and 50% bud break for each of five storage temperatures following field harvest. The temperatures tested were 1.1, 2.2, 3.3, 4.4, and 6.7°C. Storage temperatures strongly influenced the length of storage life. The three higher temperatures reduced storage life about the same and were far less effective than storage at 1.1 and 2.2 °C which prolonged time to 50% tuber sprout by 30-60 days. The cultivars were ranked longest to shortest storage life, using 10% tuber sprout at 1.1 °C as follows: 'Russet Nugget' (112 days), 'Russet Norkotah #3' (109 days), 'Russet Norkotah #8' (95 days), 'Cherry Red' (89 days), 'Durango Red' (87 days), 'Chipeta' (70 days), and 'Keystone Russet' (<30 days). Sugar levels were highest about 60 days after storage was initiated. Soluble sugar levels were highest at the lowest temperature, 1.1 °C. A rapid enzyme assay (based upon production of PNP(p-nitrophenyl)) was tested to predict dormancy. This assay uses p-nitrophenyl, alpha-D-galactopyranoside (PNPG) as a substrate for tuber tissue producing PNP, the result of cleavage of terminal galactose units from raffinose oligosaccharides (RFO) as an indication of alpha galactosidase enzyme activity. The PNP produces a yellow pigment which can be measured spectrophotometrically. The correlation for PNP production with dormancy at a storage temperature of 1.1 °C was  $r=0.79$ .