9. Correlations of potato tuber traits between the seedling generation and the first field generation, as a function of pot and plot size

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This study aimed to calculate correlation coefficients of potato tuber traits between the seedling generation (SG) and the first field generation (FFG) and their implications on selection. The work was carried out at Embrapa Temperate Agriculture, Pelotas-RS, Brazil. Three pot sizes [small(S)= 0.25 kg; medium(M)= 0.80 kg; large(L)= 2.40 kg] in SG, and three plot sizes (1, 2 and 3 plants) were tested, using ten progenies. The experiment was arranged in a split-plot design with three replications. In both generations, tubers of each plant were evaluated for yield, number, skin texture, stolon insertion depth, eye depth, eyebrow prominence, shape, flatness, curvature, pointed ends, and appearance. Coefficients were significant for yield, number, shape, pointed ends, and skin texture, but correlation was strong only for yield for L pot x L plot, moderate for M pot x M plot, and S pot x S plot; for number, moderate for L pot x L plot, while for other pot and plot sizes they were weak; for shape, moderate for L pot x L plot, and M pot x M plot; and for other traits, coefficients were low or not significant. These results suggest that in SG, using L pots, selection could be applied for yield at strong intensity, and for number and shape at moderate intensity; while using M pots, selection could be applied for yield, number and shape, but at moderate intensity; and using S pots, selection could also be applied at moderate intensity, but only for yield.

10. Breeding and development of Globodera-resistant potato varieties with long tuber shape and russet skin for production in the western United States

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Two species of potato cyst nematode (*Globodera rostochiensis,* and *G. pallida,*) have been identified in the U.S. and are under quarantine regulations, with a third newly identified species (*G. ellingtonae*) not categorized as a quarantined pest. Management of *G. rostochiensis* in the state of New York includes the use of resistant potato varieties, but resistance to *G. pallida* is not present in the primary varieties grown in the state of Idaho, where *G. pallida* was identified in 2006. The primary market class of potato grown in Idaho and the western U.S. is characterized by varieties having long tuber shape and russet skin. Potato varieties commercially available having *G. pallida* resistance typically have round tubers and white or yellow skin making them unsuitable for producers in the western U.S. Hybridizations have been conducted between *Globodera*-resistant breeding clones and varieties with russet-skinned germplasm. Progeny from an Eden x Western Russet family display *Globodera* resistance (derived from Eden) and the desired long tuber shape and russet skin (derived from Western Russet). Sources