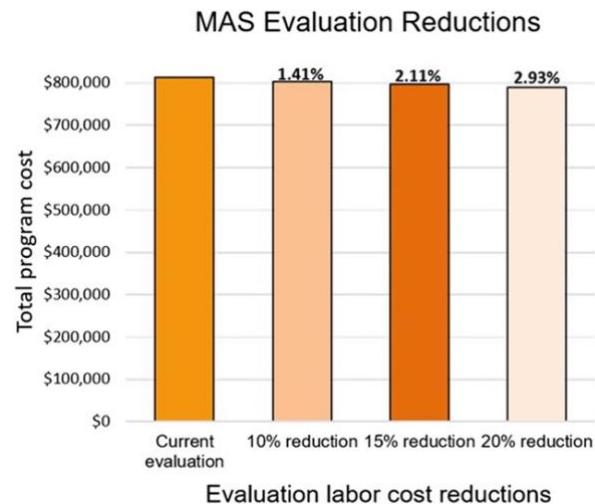


## Tree Fruit Extension Economics Research Highlight

### Do the improvements from using marker assisted selection by plant breeding programs surpass its additional costs?

By Seth D. Wannemuehler, James J. Luby, Chengyan Yue, David S. Bedford, R. Karina Gallardo, Vicki A. McCracken<sup>1</sup>

Incorporation of marker assisted selection (MAS), a type of DNA-informed breeding, improves the efficiency of plant breeding programs in expediting the selection for desired plant traits however requires additional costs associated with expensive reagents, equipment, and labor. We conducted a cost-benefit analysis examining incorporation of MAS to a Midwest apple breeding program. MAS application allows testing, at the early juvenile phase (greenhouse stage) leading to removal of inferior individuals before they reach the seedling test at orchards. Our study shows that the increased costs of MAS breeding are offset by the savings realized for seedling maintenance and evaluation of inferior individuals. The breakeven point of MAS is realized when 11.93% of inferior individuals are removed before they get into the orchards. If removal rates are above this threshold, MAS is cost efficient as the cost savings from reduced maintenance and evaluation costs of inferior individuals surpass MAS additional costs. If removal rates are below this threshold, MAS is not cost efficient. Our findings are useful to perennial crop breeding programs in which managers are considering incorporating DNA-informed breeding techniques.



<sup>1</sup> Seth D. Wannemuehler is PhD Graduate Student, Department of Horticultural Science. University of Minnesota. James J. Luby is Professor, Department of Horticultural Science. University of Minnesota. Chengyan Yue is Professor, Department of Horticultural Science. University of Minnesota. David S. Bedford is Senior Research Fellow, Department of Horticultural Science. University of Minnesota. R. Karina Gallardo is Associate Professor and Extension Specialist, School of Economic Sciences. Washington State University. Vicki A. McCracken is Associate Dean and Professor. College of Agriculture, Human, and Natural Resources. Washington State University.

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