

Safety Assessment of Potato with 3 *R* Genes for Late Blight Resistance: A Global Perspective

David Douches¹, Marc Ghislain² & Karen Hokanson^{3*}

¹*Michigan State University, East Lansing, USA*

²*International Potato Center, Nairobi, Kenya*

³*University of Minnesota, St. Paul, USA*

*e-mail: hokan018@umn.edu

Abstract

Potato is the third most important food crop worldwide. Late blight is still the most prominent, ubiquitous and devastating disease of potato since its outbreak in the 1840's provoked the Irish famine. Genetic engineering using 3 *R* genes from wild relatives provides durable resistance for existing popular varieties greatly reducing the average 15-30% production loss while cutting the need for fungicides by up to 90%. The 3 *R*-gene late blight resistant potato offers a solution for controlling the disease with significant economic benefit and less risk to human health and the environment. The Feed the Future Global Biotech Potato Partnership aims to contribute to a sustainable reduction of late blight disease, while helping emerging economies in Asia and Sub-Saharan Africa (SSA) accelerate their progress towards self-reliance through local leadership and local ownership of product development objectives and implementation. This workshop brings together key individuals involved with this project to share experiences and discuss some of the biosafety issues particularly associated with the release of the 3 *R*-gene potatoes in the target countries, including the use of cisgenics, stacked genes, intractable proteins and data transportability. Building on familiarity with conventional potato varieties, the nature of *R* genes, and use of wild relative germplasm to incorporate *R* genes through traditional breeding, a strong weight-of-evidence exists for safety of these late blight resistant potatoes. The key regulatory question is about what remains to be documented for food and environmental safety assessments in order to consider these potatoes safe as food and for cultivation.

Key words: late blight resistant potato, risk assessment, cisgenics, stacked genes, intractable proteins