Evaluation of Potato Production Best Management Practices


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ABSTRACT

A 2001 survey indicated that many growers are reluctant to adopt research-based recommendations because of a perception that it is not practical or applicable to their specific farming operation. Other growers, however, appear to adopt these practices successfully. Highlighting "model" growers is a method that can be used to field-test research findings and facilitate grower adoption. The objectives of this project were to: 1) establish field demonstrations with potato (Solanum tuberosum L.) growers who generally follow research-based best management practices (BMPs); 2) establish plots within each field to compare BMPs with a high input, maximum yield management (MYM) approach; and 3) enhance grower confidence regarding research-based BMPs. Fourteen field trials were conducted in the Pacific Northwest during 2002-2005. Five replicates of BMP and MYM plots were established in each field. The BMPs consisted of sampling, scouting, and use of prediction models to aid in determining rate and timing of inputs to maximize returns. In contrast, the MYM approach was based on tradition and calendar timing, with a near zero tolerance for pest and nutrient limitations. The MYM plots had 1.7 to 13.2% more fertilizer and pesticide costs than the BMP plots. The MYM treatments resulted in significant marketable yield increases in three fields and decreases in two fields, with the remaining nine fields and the combined average of all 14 fields being statistically equivalent. When factoring in estimated costs, only two fields resulted in a monetary advantage with MYM treatment. In contrast, the BMP treatment resulted in significant increases in net crop value in five fields, as well as the combined average of all 14 fields ($200 ha$ or 3.2%). These field demonstrations, along with associated field days and grower meetings, have resulted in many documented changes in grower practices towards BMPs, with many more undocumented changes probable.

RESUMEN

Un estudio que se hizo el 2001 indica que muchos agricultores son renuentes a adoptar las recomendaciones basadas en la investigación, debido a una percepción poco práctica o aplicable a sus operaciones de cultivo. Otros, sin embargo, parecen adoptar exitosamente estas prácticas. El destacar a los agricultores "modelo" es un método que pude ser usado para probar en el campo los resultados de la investigación y facilitar su adopción. Los objetivos de este proyecto fueron: 1) hacer demostraciones de campo con los agricultores que cultivan papa (Solanum tuberosum L.) que emplean generalmente las mejores prácticas de manejo (BMPs) basadas en investigación; 2) establecimiento de parcelas dentro de cada campo las BMPs con gastos altos, un
enfoque de manejo máximo de rendimiento (MYM); 3) incremento de la confianza del agricultor referida a los BMPs basados en investigación. Catorce pruebas de campo se realizaron el Pacífico Nor Occidental durante 2002-2005. Cinco repeticiones de BMP y de MYM se hicieron por parcela en cada campo. Los BMPs consistieron de muestreos, exploración y uso de modelos de predicción para ayudar a determinar la tasa y registro de gastos para alcanzar el máximo de ganancia. Contrariamente, el enfoque MYM estuvo basado en la tradición y distribución del tiempo, con tolerancia cero para problemas de pestes y nutrientes. Las parcelas MYM recibieron 1.7 a 13.2% de gastos en fertilizantes y pesticidas que las parcelas BMP. Los tratamientos resultaron en aumento significativo de rendimiento comerciable en tres campos disminución con los restantes nueve y el promedio combinado de los 14 campos estadísticamente equivalentes. Cuando se factorizó en gastos estimados, sólo dos campos resultaron en ventaja monetaria con el tratamiento MYM. Contrariamente, el tratamiento BMP dio como resultado un incremento significativo en cinco campos, así como el promedio combinado de todos los 14 campos ($200 ha\(^{-1}\) o 3.2%). Estas demostraciones de campo, junto con los asociados días de campo y reuniones de agricultores, han dado como resultado muchos cambios documentados en el proceder de los agricultores hacia los BMPs, con cambios probables no documentados.

**INTRODUCTION**

Over the past 100 years or so, substantial amounts of time and money have been spent by private and public entities to conduct research and produce large volumes of applied-research information on potato (*Solanum tuberosum* L.) production. Potato best management practices (BMPs) are found in many publications and are largely summarized in a variety of references (Dean 1994; Flint 1986; Gardener et al. 1985; Hopkins et al. 2007; Rowe 1993; Stark and Love 2003; and Zehnder et al. 1994).

In an effort to determine how extensively BMPs have been adopted, a verbal survey of 38 growers, representing approximately 10% of the potato production in Idaho, was conducted in 2001 (Hopkins, unpublished data). These growers were presented with a list of five BMPs for Idaho conditions that had been thoroughly documented through research. The five selected BMPs included: 1) applying fertilizer based on soil sampling and research-based recommendation tables, 2) planting seedpieces at a six-inch depth, 3) cultivating at or just prior to emergence, 4) measuring actual water use and cutting back irrigation during late bulking, and 5) applying protectant fungicides just prior to row closure and 7-14 days later with additional as-needed applications based on scouting and local pathogen pressure levels. The growers were asked if they were aware of the recommendations and if they had implemented these practices on their farm. Most of the growers were aware of the recommendations, but none of the growers had adopted all five BMPs; less than half had adopted two or more BMPs, and just over one-third had not adopted any of the practices. These results were disconcerting, and efforts were directed at increasing grower adoption of research-based BMPs.

To facilitate grower adoption of BMPs, a follow-up survey was conducted and growers were asked to provide unprompted explanations as to why they did not utilize these recommendations. Their responses were compiled into a list and all participating growers were asked to rank the importance of each explanation (Hopkins et al. 2007). Most growers indicated that they were reluctant to adopt research-based recommendations because they believed that small plot research was not usually applicable to a whole farm situation due to differences in scale and management. They also indicated that research-based recommendations were not always practical, economical, or feasible for large scale production operations. Growers also found it confusing when there were conflicting recommendations between different researchers. For example, many soil scientists recommend leaving residues on the surface over winter to minimize erosion (Hopkins et al. 2007), while some pathologists recommend residue-incorporating tillage in the fall to reduce pathogen inoculum levels for common scab and *Pythium* seedpiece decay (Powelson et al. 1993). Moreover, growers were hesitant to change practices when their current management already appeared to be successful.

These issues, both real and imagined, have played a major role in why many of the growers ignored potentially valuable information. When asked what would help boost their confidence in research-based BMPs, most growers indicated that the number one influence would be adoption by successful and respected growers. Ironically, many growers have successfully adopted some or all of the BMPs in question. Based