

## Development of an Herbicide Injury App for Mobile Devices

**Period Covered:** March 1, 2017 to February 28, 2018

**Project Leader and Co-PI:** Kevin Bradley and Mandy Bish

**Summary:** When herbicide injury is observed in the field, the primary question is: how is this going to affect my crop? A first step in understanding that question is identifying what type of herbicide caused the injury. A lack of mobile app resources to help identify herbicide injury in the field led us to ask: Can we develop a user-friendly, mobile app to help ag professionals diagnose herbicide injury, even when cell phone reception is poor?

The grant provided by the Missouri Soybean Merchandising Counsel subsidized the costs associated with addressing this question and completing the objective. The Herbicide Injury ID app is scheduled to launch prior to the 2018 Missouri growing season. The mobile app allows users to:

- diagnose herbicide injury with a diagnostic key that uses visual symptoms of the plant(s) to narrow down the possible herbicides
- search for specific herbicides or sites-of-actions (groups) if the user believes he/she knows what type of herbicide is responsible for damage
- take photos and e-mail them directly to Dr. Bradley for diagnostic help

This mobile app will be available on Apple and android devices. Most data will be stored on the phone so that relevant images and information are available to the end user at all times, regardless of cell reception.

An administrator database was developed for mobile app maintenance. The database allows easy-access for Dr's. Bradley and Bish to update information and images as they becomes available instead of paying for, and waiting on, availability of computer programmers to consistently update the app.

Long-term financial returns from the project are difficult to project. However, the ability to diagnose herbicide injury real-time within the field will allow soybean producers to make timely decisions on how to respond. Total cost of the project is currently \$59,500, and will increase slightly as hourly labor assists in updating information to the mobile app. The \$20,700 provided by MSMC was allocated as follows:

- \$12,500 – Missouri Department of Information Technology (DoIT) for programming and developing the mobile app and the administrator database
- \$8,200 – Graduate student Brian Dintlemann's stipend and benefits. Brian's research has been used to generate timely herbicide injury photos to be incorporated into the mobile app

The remnant of the costs is being paid through a U.S. Dept. of Agriculture Grant (\$10,000) and out-of-pocket by Dr. Bradley (\$28,800 plus any accrued hourly labor costs and a \$25 per month fee to store the mobile app information on a web server.) The MSMC logo appears on the 'about page' of the Herbicide Injury app in addition to Mizzou Weed Science and University of Missouri logos.

The mobile app will be available for \$0.99. Two reasons for charging a small fee for the app:

- Current trends in public opinion suggest a service provided freely is not perceived as useful or high quality when compared to a service that one must pay to use.
- The entire process of developing a charge-for-use app within the University of Missouri is not well understood; this app has served as a precedence for development of future apps.

An invention disclosure agreement was filed with Brett Maland in the Office of Technology & Industry Relations (OTMIR) at the University of Missouri. Given the small fee for the app, it is unlikely to generate significant revenue. Initial funds generated will go towards research in Dr. Bradley's program to help off-set the monthly server space fee. If/when revenue generated exceeds \$1,000 this will be reported to MSMC, who can determine their interest in pursuing a royalty-sharing agreement with the University.

Once the app has been released in both market places and deemed to be successful, we will work to issue a press release will be issued by the University of Missouri to describe the app.