Turfgrass Management at Your Fingertips: Information Delivered Through "Smart" Phone Technology

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Turfgrass Management at Your Fingertips: Information Delivered Through "Smart" Phone Technology

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Abstract: Turfgrass managers and Extension professionals often require real-time, in-situ pest diagnosis, management, and recommendations. Advanced "smart" phones have become important tools for industry professionals and allow flexibility while traveling or away from the office. We have developed an application (app) for iPhone® and Blackberry® "smart phones" that allows access to a library of resources in the field. The Turfgrass Management application contains a full suite of weed, disease, insect, and turfgrass species resources. More than 2,500 subscriptions from over 30 countries have been downloaded. We present evidence of the usefulness of delivery of information through this mobile technology.

Introduction

Economic impacts of the U.S. turfgrass and lawncare industry in 2005 generated $124.6 billion of total output impacts, value added, and labor income (Haydu, Hodges, & Hall, 2006, 2008, 2009). In Georgia, there are 1.9 million acres of turfgrass and 520 golf courses/ranges with an economic impact of $1.8 billion. The 2009 sod production farm gate value was $116.4 million (Bauske, Martinez-Espinoza, Maqueda, & Chance, 2008; Cooter, Papendidick, & Washignton, 2003; Florkowski & Landry, 2009; Waltz, McCullough, Hudson, Braman, & Martinez, 2010).

Turfgrass management requires rapid, exact, science-based information for decisions and planning. Advanced "smart" phones have become important tools for turfgrass managers, Extension professionals, crop consultants and sod producers to access phone, email, and Internet while in the field. A recent breakthrough has been the development of application software known as "applications," "Web apps" or "apps." An "app" is a computer software program that performs indicated tasks according to encoded instructions. In 2010 there were over 200,000 apps available (Jobs, 2010).

We have developed the first "app" specifically designed for turfgrass managers (Figure 1). The Turfgrass Management app contains a suite of weed, disease, insect, and turfgrass species. The application allows both Extension and turfgrass professionals to deliver and obtain information through mobile technology.

Figure 1.
Turfgrass Management "App" Design

For Extension professionals, the development of an application and the delivery of information through this technology present an invaluable, fast, accurate, new resource and delivery of information. For turfgrass professionals, the app makes the information to be delivered *in-situ*, exact and instantaneously.

Results and Discussion

Turfgrass Management Applications

Turfgrass Management Lite = Free of charge and contains a detailed photo gallery of weeds, diseases, insects, and turfgrasses.

Turfgrass Management Subscription = Contains pictures, information, and management recommendations for weeds, diseases, insects, and turfgrasses. Content includes fungicides, herbicides, insecticides, and growth regulators. This version also has sections for Extension publications and presentations.

Description of Turfgrass Management App

Turfgrasses Species: This section contains information on 14 primary cool- and 12 warm-season turfgrass species.

Turfgrass Diseases: This section contains five main categories, including 41 abiotic diseases, foliar diseases, crown and root diseases and 102 fungicides and non-infectious diseases.

Turfgrass Weeds: This section contains six categories, including 200 broadleaf weeds, grassy weeds, preemergent herbicides, post emergent herbicides; spray adjuvants, and turfgrass growth regulators. The herbicide section has information, uses, and rates of herbicides listed by trade name or common name. The spray adjuvants and turfgrass growth regulators sections have information and usage of hundreds of these products.

Turfgrass Insects: This section contains four categories, including beneficial insects, insecticides, subsurface feeders, and surface feeders. Images and control options for 44 insects are presented.

Search Option: The search option allows users to type in the name of the grass, pest, or chemical and will direct the program to the specific text. Users may also enter a component or mixture products or search for pesticides with a specific active ingredient

Turfgrass Management Application Usage

As measured by the number of applications downloads and purchases, the delivery of information through this technology has been widely accepted. Nine months after the release of the application the Turfgrass Management – Subscription has been downloaded 650 times, while the Turfgrass Management – Lite has been downloaded approximately 2,500 times (Table 1). The application has been accessed and downloaded in every state in the U.S. Furthermore, the Turfgrass Management app has been popular internationally. The app has been downloaded in over 30 countries (Table 2).

Table 1.
Turfgrass Management Usage

Turfgrass management app type	Content	# Total downloads (as of May 17 2010)	Average downloads per month	Cost to user	Availability
Lite (L)	Pictures and information (turf, diseases, weeds, insects)	2500	277	Free	iPhone; Blackberry
Subscription (S)	Pictures, information, recommendations, pesticide database, publications, and presentations	610	67.7	$19.99 per year Subscription	iPhone; Blackberry

Table 2.
Turfgrass Management Lite Application Downloads Listed by Region

Region	Countries	Number of Downloads

Asia	China, Japan, Malaysia, Vietnam, Singapore, South Korea, Taiwan, Thailand, Philippines	33
Australia and Africa	Australia, South Africa , New Zealand	76
Europe, Eastern Europe and Russia	Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Ireland, Italy, Norway, Poland, Portugal, Russia, Spain, Sweden, Switzerland	282
Latino America	Brazil, Ecuador, México, Nicaragua, Dominican Republic	7
Middle East	Israel, Lebanon, Saudi Arabia, Turkey	9
North America	USA and Canada	2124
	Total	**2531**

Popular press media, printed and electronic, have indicated adoption of the app by industry practitioners. The Turfgrass Management app was featured on the cover of the October 2009 issue of *Golf Course Industry* (Figure 2) magazine targeted to golf course superintendents. Other publications include *Golf Course Management*, *Southern States*, *Lawn and Landscape*, *Turf News*, and *Sports Turf*. Academic institutions have featured the app, including UGA, CAES-UGA Web page, Georgia Faces, and eXtension

Figure 2.
Examples of Electronic and Printed Media Featuring the Turfgrass Management Application"

What Extension Professionals Need to Know for App Development

- No previous knowledge of app programming is needed. Independent companies are available to develop this technology. Development and selection of the information to be presented in the app is the only requirement.

- A concept of packaging developed information for a target audience is necessary. However, this is no different than the general knowledge required while developing the appearance of a Web site.

- Extension professionals must develop a strategy for copyrights (on for sale publications). This can be mimicked from other "for sale" publications at your institution.

Benefits to Turfgrass Managers

- For turfgrass professionals, the app makes the information to be delivered *in-situ*, exact, and instantaneous without the need of returning to the office to obtain the information.

- The app improves pest management and reduces the potential of pesticide misuse or misapplication, saving money and the environment.

Benefits to Extension Professionals

The technology offers a unique opportunity to reach adaptable, on the move clientele.

- For Extension professionals, the development of application and the delivery of information through this technology present an invaluable, fast, accurate, new resource and delivery of information.

- Development of structured, science-based information is the only prerequisite.

- Extramural revenue is an advantage in an academic environment of increased competition for limited resources.

- In contrast with printed publications, the information delivered through the application can be updated, restructured, augmented, and corrected continuously. For example, The University of Georgia publishes an annual pest control handbook that is a compilation of recommendations from extension specialists. With mobile technology, end users can have updated recommendations rather than waiting for the annual handbook publication.

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