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Agricultural Biotechnology Training for Extension Educators

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Introduction

Recent advances in plant biotechnology have led to significant changes in crop varieties and cropping systems in the United States, in particular the rapidly expanding cultivation of transgenic or genetically modified (GM) crops (Liu, 1999). Such crops, which contain artificially inserted genes, have been hailed as a major advance in agricultural technology and simultaneously condemned as a grave threat to the environment and to human health.

In Europe, which represents a significant market for U.S. agricultural producers, widespread and vehement public opposition has effectively shut down importation and domestic production of GM crops, while in the U.S. public uncertainty is growing, together with calls for stricter regulation (Gaskell, Bauer, Durant, & Allum, 1999; National Academy of Sciences, 2000). With billions of dollars already invested in the development of GM crops and with over half of the soybean and cotton and a quarter of the corn grown in the U.S. in 1999 consisting of transgenic varieties, potential public opposition to GM crops is a major concern for U.S. agricultural producers and businesses (Ferber, 1999).

It has been argued that public acceptance or rejection will be an extremely important factor in determining the future of GM technology (Saba, Moles, & Frewer, 1998). Yet many Americans feel themselves to be poorly educated about transgenic crops and GM foods and rely on the media for information (Frewer, Howard, & Aaron, 1998).

Much of the information currently available through the Internet or media sources is either from the biotechnology industry itself and is unabashedly promotion, or it is from groups organized to campaign against GM technology and is clearly biased. Therefore, a group of plant breeders, nutritionists, and agricultural education specialists familiar with GM technology have initiated a project (through the support of a USDA IFAFS grant) to provide reliable, accessible, complete, and unbiased information on GM crops and foods to as wide an audience as possible. One of the first audiences receiving the information was composed predominately of Extension educators.

In February, 2001, pre- and post-tests (Vestal & Briers, 1999) were administered to participants in a biotechnology workshop offered by faculty of the Soil and Crop Sciences Department at Colorado State University. Fifty-five of the 100 participants completed the instruments that measured awareness, attitude, delivery, and demographics. The vast majority (84% or 46) respondents described their primary occupational responsibility as Extension educator, of whom 33 (60%) had 11 or more years in that role.

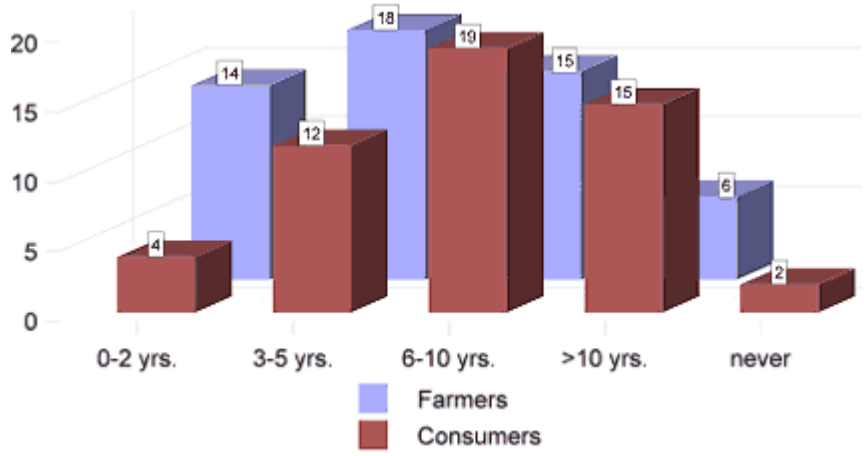
Results

Newspapers (47), Internet/World Wide Web (28), and "popular" magazines (26) were the most widely reported media sources used by respondents to learn about biotechnology. In the previous 6 months or less, 93% (51) of the respondents had read or studied about biotechnology; 20% (11) had given a presentation related to biotechnology.

Biotechnology is a topic that the respondents are reading about, and, in some cases, incorporating into their Extension programming. However, the sources of their information may be of some concern. A national study by Vestal and Briers (1999) found that journalists' knowledge of biotechnology was low, and, therefore, the heavy reliance by respondents on newspapers and popular magazines as sources of information may be ill-advised and lead to further confusion about biotechnology for them and their clientele.

When asked to predict how long it will take the average farmer to accept U.S. Government (EPA, FDA, and USDA) approved biotechnology as an acceptable farm practice, 26% said 0-2 years, 34% said 3-5 years, 28% said 6-10 years, and 11% said more than 10 years. Conversely, respondents predicted consumers would take longer to accept U.S. Government-approved biotechnology (8% said 0-2 years, 23% said 3-5 years, 37% said 6-10 years, 29% said more than 10 years, and 4% said never). Predictions that farmers will, on average, accept biotechnology as an acceptable practice sooner than consumers sets up potential conflict between farmers and consumers, and underscores the need for widespread education (Figure 1).

Figure 1.
Number of Years Predicted for Acceptance of Biotechnology



Following the workshop, respondents said the level of importance placed on possible biotechnology research in the areas of reduction of pesticides, benefits to the environment, control of released genes, safer food, harming the environment, added nutritional value, and risk compared to pesticides was important (range of means from 1.38 to 1.88 with1 = extremely important to 4 = not at all important). Additionally, respondents held the biotechnological statements of university scientists in high regard. Organizations held in less regard were health professionals, government agencies, farm groups, biotech companies, food companies, and celebrities. (See Table 1.)

Further, respondents felt it was important for them to investigate claims and statements made by activist groups, food companies, biotech companies, government agencies, and university scientists (range of means from 1.37 to 1.9 with 1 = extremely important to 4 = not at all important). Coupling respondents' viewing university scientists as key sources of biotechnology information with their reliance on the Internet as a media source, it is recommended that university scientists step up the development (and marketing) of biotechnology education Web sites.

Table 1.
Level of Faith in Statements About Biotechnology

Spokespersons/Organizations	Mean	SD
University scientists	2.10	.76
Health professionals	2.63	.88
Government agencies	2.92	.99
Farm groups	3.26	.56
Biotech companies	3.68	1.04
Food companies	3.68	.74
Celebrities	4.60	.76

Note. 1 = very high to 5 = very low.
MN = Mean, SD = Standard Deviation.

Participants found the workshop was worth their time (5.02 MN, .77 SD, 1 = not at all to 6 = great deal) and found the content useful (1.61 MN, .60 SD, 1 = useful to 6 = of little use). The technical content of the workshop was

"about right" for 92% of the respondents. Overall, the workshop was rated good or excellent by 88% (43) of the respondents. Biotechnology educational information was perceived to be useful, and respondents were not overwhelmed by the technical science embedded in the workshop. It is recommended that throughout the project, respondents' awareness, attitudes, and demographics be collected and analyzed to measure relationships that exist among these variables prior to, immediately following, and one year after experiencing a biotechnology workshop.

Conclusions and Recommendations

Respondents in this study were relying on the same biotechnology information sources as the general public. Despite respondents holding university scientists in high regard, they generally were not relying upon them for information about biotechnology. Consequently, potential collaborations exist between biotechnology Extension specialists and Extension educators in developing accurate, unbiased biotechnology workshops.

It would appear that Extension educators are uniquely positioned to communicate biotechnology information to consumers and farmers. Therefore, Extension educators could become key players in dealing with the consumption/production gap that exists (Ferber, 1999) by offering biotechnology workshops in the contexts of consumption and production.

Workshop content will have to be based on assumptions of low levels of GM food and transgenic crop knowledge (Frewer, Howard, & Aaron 1998). However, it appears that respondents in this study would find a series of workshops reporting findings of biotechnology research in the reduction of pesticides, benefits to the environment, control of released genes, safer food, harming the environment, added nutritional value, and risk compared to pesticides to be beneficial.

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This article is online at http://www.joe.org/joe/2004february/rb6.shtml.
