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Equine Owner Knowledge and Implementation of Conservation Practices

Jennifer M. Marriott

Graduate Student

IFAS, Gulf Coast Research and Education Center

University of Florida

Wimauma, Florida

bandelara@gmail.com

Amy Shober

Assistant Professor

Plant and Soil Sciences

University of Delaware

Newark, Delaware

ashober@udel.edu

Paul Monaghan

Assistant Professor

Agricultural Education and Communication

University of Florida

Gainesville, Florida

paulf@ufl.edu

Christine Wiese

Research and Extension Assistant

IFAS, Gulf Coast Research and Education Center

University of Florida

Wimauma, Florida

hibiscus@ufl.edu

Abstract: *Various outreach programs promote best management practices (BMPs) for small farms, including equine farms; however, many horse owners may fail to get this information. A survey was completed by 230 people who owned and/or managed an equine facility to examine the current level of knowledge about nutrient (manure) management and awareness of extension services available. Results show that less than half of respondents use conservation techniques on their farms; 93% of Florida and 73% of non-Florida respondents, respectively, had never spoken with a conservation agency. Results of the survey have implications for educating equestrians about nutrient management and conservation techniques.*

Introduction

Nonpoint source pollution from agriculture has been recognized as the primary source of water quality impairment in the United States (U.S. Environmental Protection Agency, 2000). Equine farms can contribute to water quality problems if not managed properly (Airaksinen, Heiskanen, & Heinonen-Tanski, 2007; Fraser, 2007; Weaver, Entry, & Graves, 2005), but are often too small to be targeted by outreach services (Westendorf, Joshua, Komar, Williams, & Govindasamy, 2010a). Despite the economic impact (\$3 billion in goods and services) and widespread distribution of horses in Florida (500,000 horses in 2005) and across the United States, relatively few studies have evaluated awareness and implementation of conservation or best management practices (BMPs) among horse owners (Prokopy, Reimer, & Perry-Hill, 2010; Westendorf, Joshua, Komar, Williams, & Govindasamy, 2010b).

In a recent survey, Prokopy, Reimer, and Perry-Hill (2010) discovered that many respondents had limited awareness of conservation practices and subsequent benefits beyond their farm. Many respondents were incorrectly using conservation practices implemented on their farms, for a reduced benefit (Prokopy et al., 2010). When implemented, BMPs can have long-term impacts on animal health, pasture health, erosion control, and onsite water quality (Singer, Bamka, Kluchinski, & Govindasamy, 2002).

A review identified education level, capital, and access to information as variables that were more likely to have a positive relationship with BMP adoption (Prokopy, Floress, Klotthor-Weinkauf, & Baumgart-Getz, 2008). However, Prokopy et al. (2010) concluded that equine farm operators were "not reliably receiving in-depth information about conservation practices" and that understanding and awareness of

the conservation techniques varied widely among horse owners.

The objective of the study reported here was to address:

1. What is the level of awareness and knowledge of conservation practices primarily in Florida among the equestrian community?
2. Where do respondents acquire conservation information?

Best management practices designed to minimize the effect of agriculture on the environment, primarily in terms of water quality, have been in place for cattle in Florida since 1999, but BMPs for equines were just drafted just in August 2010 (Florida Department of Agriculture and Consumer Services [FDACS], 2010). The results of the study reported here will be used to target distribution of information on equine BMPs to outreach programs within the equestrian community.

Methods and Procedures

Survey

A 55-question survey was prepared and delivered online using Survey Monkey. Potential survey respondents were located through local horse-related organizations, networking, and local horse shows. Web links to the survey were distributed by email, Facebook, a forum post on the Chronicle of the Horse webpage, and an advertisement in *Horse & Pony* magazine. We assumed that respondents owned or had control over management of the land they described in their survey response.

The survey was comprised of 10 sections that questioned respondents about farm demographics, land characteristics, outreach information sources, conservation practices, manure management, and composting.

Farm demographic information:

- Total number of horses onsite
- Pasture acreage
- Equestrian background of respondent
- Location of farm and primary onsite horse activities

Land characteristic information:

- Land topography
- Presence of water bodies onsite
- Other agricultural activities practiced onsite

Additionally, respondents were asked if they thought soil erosion or run-off into nearby wetlands was an issue on their property.

Outreach information regarding familiarity with existing programs:

- Small farm assistance
- Local
- State
- Federal
- University-based programs

Information regarding conservation practices:

- Turnout time provided horses
- Weed and pasture management strategies
- Rotational grazing
- Use of all-weather paddocks (dry lots)
- Fencing animals away from water bodies
- Directing run off to minimize soil erosion

Manure management information:

- Manure storage locations and methods
- Uses of the collected manure
- Use of vegetated buffer strips

Respondents who indicated they composted were asked additional questions about composting routine, additions, frequency of rotations, and use of compost. Both the composting and non-composting sections inquired about challenges to manure management and composting, and whether there was intent to continue in the future or a desire to initiate a composting program, respectively.

Data Analysis

Survey results were analyzed using SPSS 19 (SPSS for Windows Release, 2010). Data were analyzed within location (Florida respondent and non-Florida respondent) and compared between location. Data were analyzed using descriptive statistics (mean, median, frequency) and crosstabs in SPSS 19, with additional visual inspections of the dataset to note outliers or abnormalities in the dataset. When possible, respondent comments were used to place data in "other" categories within an existing category. Category responses were condensed into simplified categories when this would allow a more complete data set to be analyzed. A chi-square test (with significance level of $\alpha = 0.05$) was used to compare responses regarding conservation knowledge and practices between Florida and non-Florida groups using SAS version 9.2 (SAS, 2003).

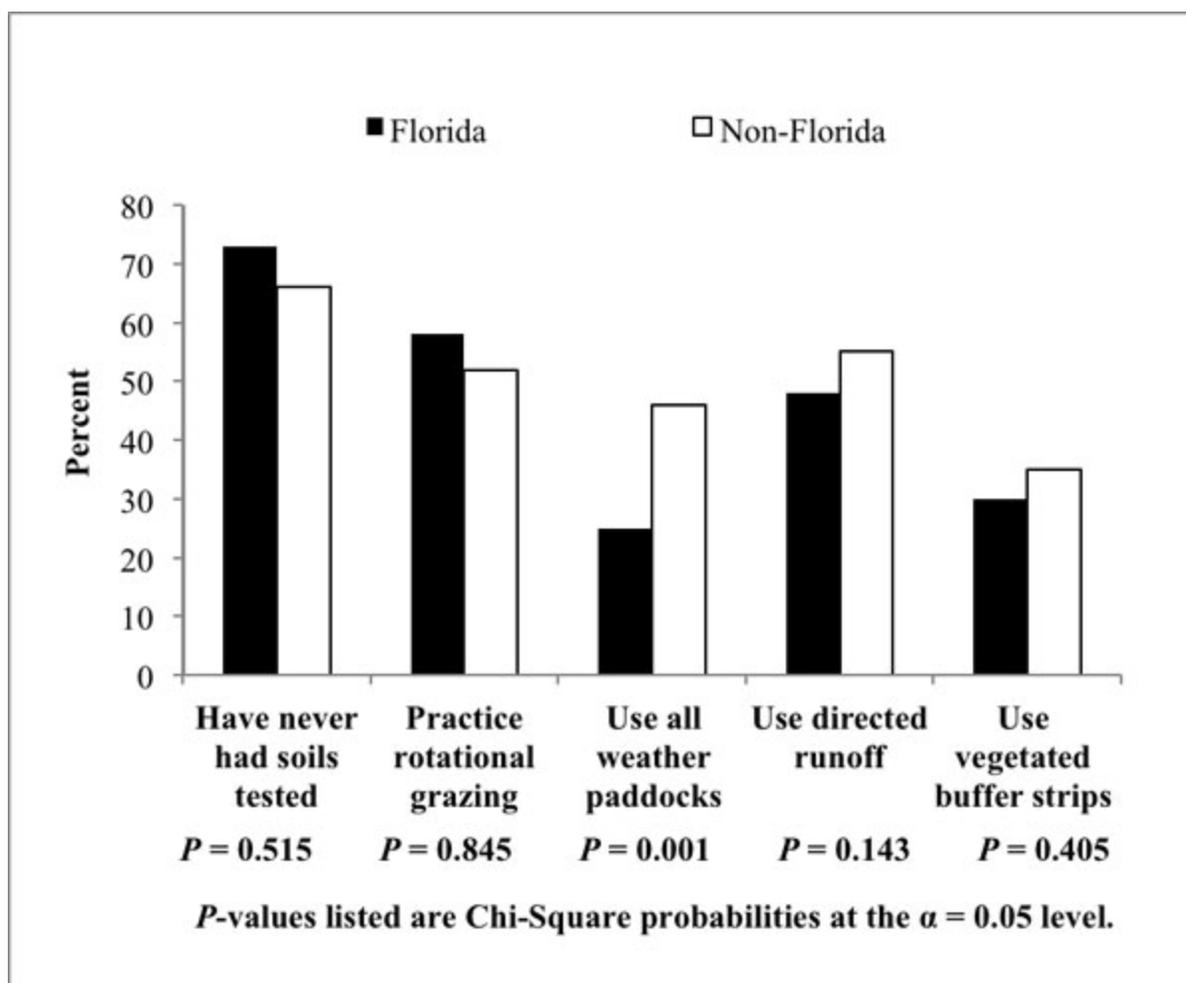
In order to participate, potential respondents needed computer and Internet access. Conclusions are inherently biased towards those able to access and use the Internet, and associated assumptions based on education and/or economic background. We recognize an underlying assumption that the respondent population may be more likely to adopt conservation practices than the general population.

Findings

Of 230 surveys received with some portion completed, 69 were completed by Florida residents, while 161 were completed by horse owners from outside Florida. Among those who took the survey, an 84% survey completion rate was achieved. There were few differences between Florida and non-Florida respondents with regard to conservation knowledge and practices (Figures 1 and 2). Florida residents were more likely not to consider soil erosion a problem on their property ($P = 0.007$). When Floridian survey participants had heard of a conservation or extension agency, non-Floridians were more likely to have contacted them than Floridians ($P = 0.004$). Non-Florida residents were more likely to have an on-site manure pile ($P = 0.001$) and an all-weather paddock ($P = 0.001$) than Florida residents (Figure 1). There were no differences between Florida residents and non-Florida residents with regard to other conservation practices surveyed (Figure 1).

Figure 1.

Implementation of Conservation Practices by Florida and Non-Florida Equine Owners



Farm and Land

Stocking density (available pasture acres per horse) was calculated based on a conservative stocking density of 2-2.5 acres per horse (Newman, Johnson, Vendramini, Chambliss, & Ezenwa, 2010; Singer, Bamka, Kluchinski, & Govindasamy, 2002). Florida respondents own and/or board on average, 6.55 horses on 11.8 acres of pasture (average stocking density of 1.52 horses per acre). Outside of Florida, respondents reported an average of 9.32 horses on 15.6 acres of pasture (average stocking density of 1.50 horses per acre). Stocking density at respondent properties in all locations exceeded the optimal density approximately 67% of the time.

In Florida, respondents did not consider soil erosion (71%) or runoff into wetlands (74%) an issue on their property, compared with 53% and 65%, respectively, of respondents from other locations. Among respondents who reported that runoff or

erosion were not significant problems, 41% of Florida respondents and 48% of other respondents had at least one other type of agricultural activity (e.g., crops or livestock) on their property.

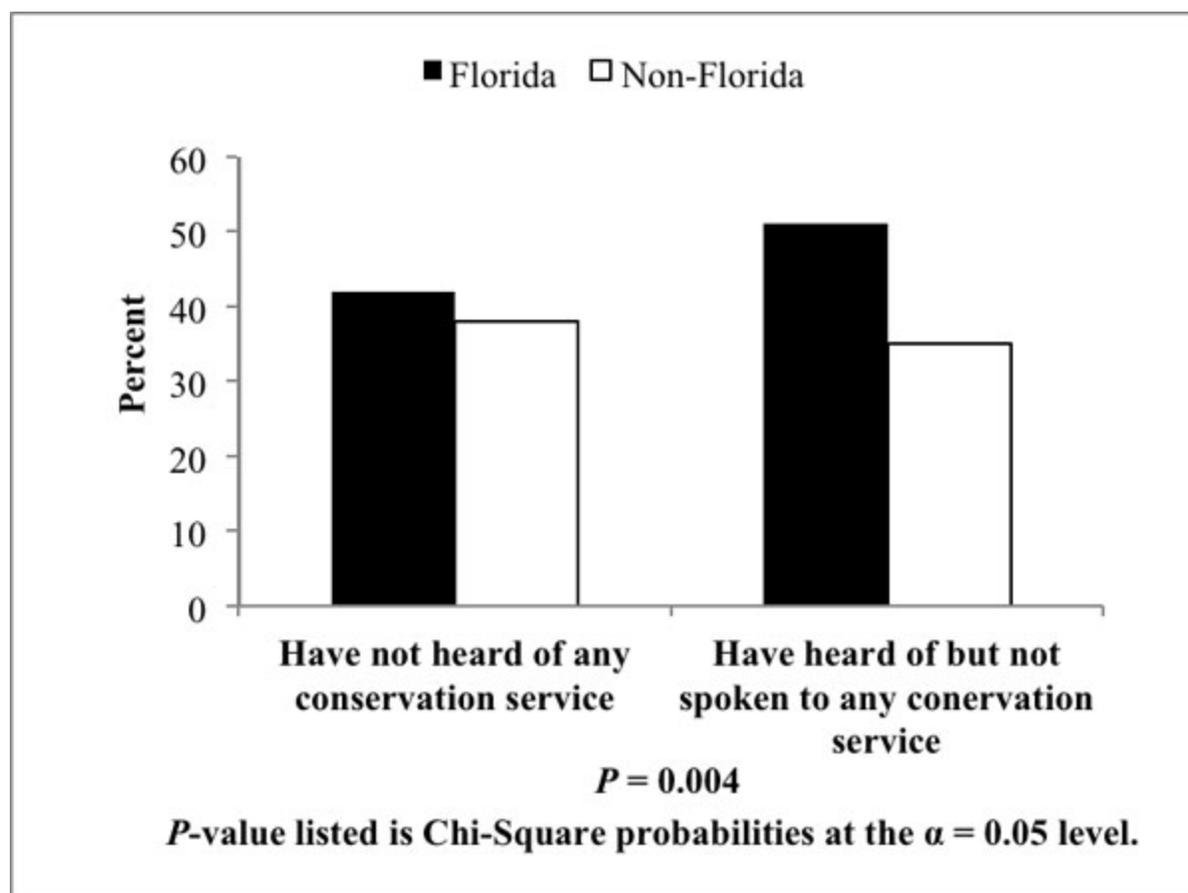
Outreach and Information Sources

Respondent awareness of conservation and Extension agencies did not vary significantly between Florida and non-Florida respondents (Figure 2); 42% of Florida and 39% of non-Florida respondents reported that they had never heard of any of the listed agencies (Figure 2). Among Florida respondents who were aware of some conservation and Extension agencies, 51% had heard of at least one listed agency, but had never spoken to them, compared with 35% of the non-Florida respondents (Figure 2).

While many respondents were aware of at least one conservation practice, less than 55% of all respondents reported implementing any of them, with the exception of rotational grazing by Florida respondents and the use of all-weather paddocks (dry lots) by non-Florida respondents (Figure 1). Many respondents expressed an interest in learning more about composting and other conservation techniques, but more than 25% of Florida residents identified lack of knowledge as preventing them from improving their manure management system.

Figure 2.

Awareness and Interaction with Conservation Services Reported by Florida and Non-Florida Equine Owners



Conservation Practices

Conservation practices listed below were identified as the BMPs most likely to affect manure management. These practices, when implemented properly, can have net positive benefits to land and water quality, as well as animal health; and, conversely, poor implementation can have net negative results. Pasture management includes all activities involved in ensuring a healthy pasture, providing the foundation for any operation with grazing livestock. Equine time on pasture provides an idea of how often horses are contained in paddocks or stalls, and offers a perspective on where manure is located that needs to be managed. Manure management and composting both provide details on how manure was handled on the surveyed farms.

Pasture Management

The primary method of pasture management was weed control by bushhogging or mowing fields; herbicide treatments were the second most common management strategy. Most respondents had never had their pasture soils tested (73%, Florida respondents; 66% non-Florida respondents).

Equine Time on Pasture

Non-Florida horses were turned out, on average, more hours per day than Florida horses (Table 1); 26.1% of Florida and 19.3% of non-Florida respondents kept horses in an enclosed space such as a stall or dry lot at least half a day on average.

Table 1.

Equine Time on Pasture: Average Hours per Day Horses were Turned Out as Reported by Florida and Non-Florida Equine Owners

| | Spring | Summer | Fall | Winter | Average - Year Round |
|-------------|--------|--------|------|--------|----------------------|
| Non-Florida | 18.0 | 19.7 | 18.3 | 16.4 | 18.1 |
| Florida | 15.6 | 15.5 | 16.1 | 16.0 | 15.8 |

Manure Management

The majority of respondents (both in and outside of Florida) used onsite manure piles to manage manure; however, less than 20% of these respondents used an impermeable surface under or cover over the pile. Manure was primarily spread onsite (60% of respondents) as a method of disposal.

Composting

Composting was used by 42% of Florida and 55% of non-Florida respondents. However, it is important to note that approximately 4% of Florida and non-Florida respondents acknowledged that they did not have knowledge of manure composting practices.

Discussion

Survey results did not indicate any correlation between years of experience and awareness of conservation practices. In fact, respondents with more experience were more likely to have higher than ideal densities of horses. High stocking densities require more careful management of farm resources to reduce animal impact on pest control, sanitation, and water quality. Our results were consistent with findings by Westendorf et al. (2010b). Most respondents did not utilize BMPs relating to manure management. Similarly, Prokopy et al. (2008) found that farmer experience was more likely to have a negative effect on BMP adoption.

Awareness of available resources and education of equine farm owners and land

managers is needed to help them become better stewards of their land (Martinson, Hathaway, Wilson, Gilkerson, Peterson & Del Vecchio, 2006; Nadeau & Meader, 2003). Prokopy et al. (2010) found that many farm owners/managers struggled to find "reliable information about conservation practices." Prokopy et al. (2008) identified youth, larger acreage, higher education levels, more income/capital, diverse operations, and access to labor as factors that tended to increase acceptance and implementation of conservation practices. Our study found that most respondents did not match these factors. More than half of Florida respondents reported at least 20 years of experience with horses, and approximately half of Florida equestrians make less than \$75,000 (American Horse Council [AHC], 2005), suggesting that available resources may be limited. In fact, implementation costs were cited as the dominant reason that respondents did not make improvements to manure management systems. Similarly, Battel, and Krueger (2005), reported costs as a barrier to BMP implementation.

These challenges will require creative solutions to bridge the gap between available knowledge and information, and the farms where it is needed. There is a need to demonstrate to horse owners that implementing conservation practices does not need to be expensive and can be done with limited time investments and that, by improving their on-farm conservation practices, they are making a positive impact on regional water and soil resources.

Recommendations for increasing knowledge of conservation practices within the equestrian community include:

- Hands-on workshops or opportunities for equestrians to see conservation practices in use.
- Demonstration farms with conservation techniques in place for equestrians to visit.
- Expanded education on water quality concerns and landowners contributions to non-point source pollution.
- Brochures expanded into interactive online presentations.
- Participation by conservation organizations in a greater variety of local equestrian events.
- Increased publication by conservation organizations in regional magazines.

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