Southeastern Watermelon Growers Perceptions of Pollinator Friendly Practices

Lauren A. Roberts
Trenton High School
1013 N. Main St.
Trenton, FL 32693
laurenroberts979@yahoo.com

Andrew C. Thoron
Abraham Baldwin Agricultural College
2802 Moore Hwy
Tifton, GA 31793
Ph: 229-391-5280
andrew.thoron@abac.edu

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Introduction/Need for Research

Honey bees pollinate an estimated $15 billion of crops each year (USDA, 2016). Watermelons are completely dependent on bee pollination to produce a higher quality and quantity of fruit (Ellis & Stanford, 2016). Researchers have found that pesticides, specifically the class of insecticides that are neonicotinoids, contribute to high colony loss rates (Grossman, 2013). However, pesticides are needed to control leaf-eating pests for a higher yielding crop. Recent studies (Roberts, 2016 & 2018) investigated product repellency properties that can be used to prevent bees from visiting watermelon crops for a short time period during pesticide application. Before the creation and marketing of a product, it was important to first describe the current pollinator friendly practices and to determine producer perceptions of using a repellent on their crop to protect the honey bee population. Therefore, the purpose of this study was to describe the watermelon growers' attitude and knowledge towards pollinator friendly growing practices. The study sought to describe watermelon growers' willingness to use bee repellents that would not harm watermelon plants. This study consisted of five objectives: 1) to describe the participants in the study; 2) to describe southeastern watermelon growers perceptions of pollinator importance; 3) to describe southeastern growers knowledge of conservation programs; 4) describe southeastern growers agricultural practices to improve pollinator health; 5) and describe southeastern watermelon growers perceptions of pollinator services.

Conceptual/Theoretical Framework

Previous studies were able to determine homeowners intentions to use irrigation methods based on their current knowledge, assessed attitudes, current behaviors, subjective norms (Chaudharyl, Warner, Lamm, Israel, Rumble, & Cantrell, 2017). The theory of planned behavior was a guide that allowed for the measure of subjective norms and behavioral intention thus leading to the behavior – in this case, making production choices that are beneficial for pollinators.

Methodology

The study utilized a survey research design. The survey instrument was researcher developed based on the work of Sedivy (Shipman, 2018). The instrument consisted of 61 individual Likert-type questions that centered around five constructs (1) pollinator awareness (2) pollinator conservation programs (3) pollinator practices (4) pollination services (5) demographics. Prior to administering the survey, the instrument was reviewed by a panel of experts from the University of [university] and local watermelon producers for face and content validity. The instrument was edited per the expert feedback. The instrument was pilot tested with industry production specialists to establish reliability for each construct. Each construct had a reported Cronbach Alpha of .81, .91, .86, and .84, respectively. The survey instrument was mailed out adhering to Dillman's Tailored Design Method (Dillman, Smyth, & Christian, 2014). The population of the survey was Southeastern watermelon growers. The sample included (N=256) members of the National Watermelon Promotion Board in the southeast (AL, FL, GA, LA, NC, MS, SC).

Results & Conclusions

A total of 63 respondents completed the questioner for a response rate of nearly 25%. Of the respondents, over 90% were male with a median age of 50 that had been farming over 25 years

and farmed over 500 acres of watermelons conventionally. Two-thirds were primary land owners and over one-quarter had a bachelor degree or higher.

Pollinator Awareness (selected results shown; full results will be presented on poster)
Respondents strongly agreed that bees are a critical pollinator for watermelon production (*M* =4.70, *SD* .89) and strongly agreed that pollinators improve the yield of the crops they grow (*M* = 4.59, *SD* .91). Producers/farmers agreed less that they had been encouraged to implement pollinator conservation practices (*M* = 2.56, *SD* .88) and uncertain if one of their neighbors was practicing pollinator conservation (*M* = 2.63, *SD* .68). Therefore it was concluded that the producers/farmers that responded have the knowledge of and appreciation of the importance of bees for a successful watermelon crop, but they are less aware what they can do or what others are doing to help pollinators survive and thrive in the agricultural environment.

Awareness of Conservation Programs (selected results shown, full results will be presented)
Over 90% of respondents had no knowledge or little knowledge of the following conservation programs that benefit pollinators: 1) Conservation Reserve Program (CRP) under pollinator habitat initiative CP-42; 2) additional CRP programs; 3) Conservation Reserve Enhancement Program (CREP); 4) Environmental Quality Incentives Program (EQUIP); 5) Pheasants Forever funding; 6) Bee and Butterfly Habitat Fund. Less than 10% indicated that they were enrolled in a CRP program. Therefore it was concluded that producers that were respondents were not getting information about government program or foundational funding that promotes pollinator health.

Pollination Practices (selected results shown, full results will be presented)
Over 80% of respondents utilized pollination services while just over 10% indicated that they used some of their own hives for pollinating watermelons. Further, nearly 80% of respondents indicated that they followed recommended pesticide guidelines (limiting pesticide applications to early morning or late evening) to help pollinator survival. Nearly two-thirds indicated that they would not consider eliminating the use of pesticides. However, nearly three-quarters indicated they would be willing to change application and practice to reduce the risk to pollinators. When specifically asked about the use of a repellent integrated into pesticide application; respondents were willing to incorporate and utilize. In an open ended response, many respondents asked about the cost of a repellent. Therefore, it was concluded that producers that responded have changed pesticide application, plan to still use pesticides in watermelon production, and are willing to consider supplemental measures that would strengthen the pollinators' survival.

Implications/Recommendations

The implications of this study impact the watermelon industry and the producers as well as bee keepers and those that have pollination services. Producers lack awareness of special programs from the federal government and associations that would assist them in aiding in pollinator habitat and promote better farming practice. Finally, producers are willing to seek alternatives, but want to know the costs associated with the change of practice. The following are recommendations based on the results and conclusions: 1) extension and commodity associations need to educate producers about federal, state, and association programs that promote pollinator survival; 2) continued work on a repellent to be incorporated with pesticides that will repel bees from the watermelon field would be incorporated by producers if it was not cost prohibitive, thus a low-cost repellent should be sought.

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