INCREASING COVER CROP DIVERSITY IN FLORIDA

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Introduction & Problem Statement

The purpose of this study is to gain insight about cover crop (CC) research conducted by personnel from the University of Florida. This research aims to increase the diversity and availability of CC adapted to the southeastern United States and Florida in particular, with the potential to improve soil health, serve as green manure, and suppress weeds and nematodes. Although there are commercially available leguminous CCs that provide these agroecosystem services, the number of commercially available varieties is limited and most exhibit constraints that may be avoided by use of germplasm that is not currently available commercially.

Objectives

Our objective is for farmers and agricultural service providers to evaluate the CCs we are testing and identify potential benefits and limitations of our research. Our overall goal is to improve the sustainability of horticultural crop production in Florida.

Methods & Materials

In this study, we evaluated three Sunn Hemp (SH) accessions (AU Golden, Sanni, and Tropic Sun), four cowpea (C) accessions (Iron Clay, US-1136, US-1137, US-1138), and two Slenderleaf Rattlebox (SR) accessions (PI-274767 and Red Hemp) at four locations.

We invited six farmers and/or agricultural service providers with experience using CCs to participate in a field research assessment at one of our test sites, in Hawthorne, FL, at the end of the growing season. We began the research assessment with an individual assessment where each participant made specific observations in the research plots, such as plant vigor, weed suppression, canopy cover, biomass accumulation, and any other positive or negative effects observed. After completing the individual observations, a researcher lead a structured discussion in which the participants shared their observations and provided recommendations for the research as a group.

We also hosted a field day at the same location where we distributed a comprehensive list of key advantages, potential problems, and potential barriers to the adoption of our research. Each participant scored the degree to which each of those factors either encourages or discourages him/her from using CCs using a scalar response of 1 (very encouraging) to 5 (very discouraging).

Tables

Desirable Traits	Undesirable Traits
• Weed suppression • Reducing new weed seeds • Not becoming a weed in subsequent seasons • Not a nematode host plant/does not increase nematode pressure • High nitrogen fixation • High biomass accumulation • Low seed cost • Does not deplete soil moisture	• Poor germination • Poor stand establishment

Table 1: Desirable and Undesirable Traits of Cover Crops Observed

Sunn Hemp	Averaged Score (Out of 3 points)
Sanni	3
Tropic Sun	2
AU-Golden	1
Cowpea	**Averaged Score (Out of 4 points)**
US-1138	3.25
US-1136	3.25
US-1137	2
Iron Clay	1.5

Table 2: Ranked Performance of the Cover Crops within Each Species from Best to Worst

Future Areas of Research
• Earliness of cover crop production before cash crop planting in spring (day length issue for late planted winter cover crops)
• Nematode resistance (root knot, sting, stubby root)
• Compatibility and benefits of cover crop mixes
• Greater nitrogen production
• Tonnage per acre estimates
• Seed cost, availability and supply, and re-seeding potential
• Regional seed production to reduce freight cost and match local environment
• Enhancing effectiveness of winter legumes in poor sandy soil

Table 3: Cover Crop Breeding Research Areas of Interest Identified by Research Assessment Participants

Conclusion

All of the participants are most interested in the Sunn Hemp accessions, *Sanni* and *Tropic Sun*, and two of the cowpea accessions, *US-1136* and *US-1138*. None of the participants liked the performance of the Slenderleaf Rattlebox accessions and all but one participant recommended we discontinue studying them.

Next, we will launch a virtual field day where participants will assess photographs of our field research online using Qualtrics. By creating an online assessment, we hope to achieve a higher level of participation and more comprehensive feedback about our research and the CC research needs of the Florida farming community.

Results

After completing the individual assessments in the research plots, each participant was given two green stickers and two red stickers to vote for the two CCs that show the most potential for weed suppression (greens stickers) and the two CCs that show the least potential for weed suppression (red stickers). The three CCs identified as having the *most potential to suppress weeds* were US-1138 (C), US-1136 (C), and Sanni (SH). The three CCs identified as having the *least potential to suppress weeds* were the weedy control (no CC planted), PI-274767 (SR), and red hemp (SR).

We then asked the participants to identify the *desirable traits* of the most promising CCs in our experiment and the *undesirable traits* of the least promising CCs in our experiment. Table 1 presents a summary of their comments.

After reviewing their observation forms and the group discussion notes, the participants ranked from best to worst the performance of the CCs within each species. Not all participants ranked each CC so we calculated the average score based on the number of participants that ranked each of the CCs. None of the participants ranked the Slenderleaf Rattlebox accessions due to poor performance overall. The *most highly ranked accessions* were US-1138 (C), US-1136 (C), and Sanni (SH). Table 2 presents a summary of the rankings and scores for each accession.

The research assessment participants then listed *areas of CC research* that could potentially be addressed by a breeding program. Table 3 presents a summary of the suggestions.

After exploring our research plots on their own, three of the six field day participants ranked the advantages, disadvantages, and barriers to adopting our research using a scalar response of 1 (very encouraging) to 5 (very discouraging). The top three factors identified that *encourage farmers to use CCs* are suppressing weeds (1), attracting beneficial insects (1), and increasing cropping system biodiversity (1). The top three factors identified that *discourage farmers from using CCs* are timing the termination of the CC with the cash crop cycle (3), timing the establishment of the CC with the cash crop cycle (3), and difficulty dealing with CC residue when preparing to install plastic mulch (3).

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