CCAP 2005-2006
Status Report
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Project Title: Native Wildflower Seed Production – Establishing a Lanceleaf Tickseed Seed (*Coreopsis lanceolata*) Production Planting via Small Farmer Supplied Transplants

Starting Date: September 1, 2005 **Ending Date**: October 31, 2006

Type of Project: Alternative Crop Production **Location:** Univ. of Florida/IFAS, North Florida Res. & Edu. Ctr., Quincy

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1. Introduction

Production of Florida ecotypes of native wildflower seed is a fledgling industry in Florida but one with great potential for small farmers as demand far exceeds supply and is expected to for the foreseeable future. The reason for the great demand is that the seed of native wildflower species being produced in Florida are derived from Florida populations and hence are adapted to Florida environmental conditions, unlike much of the seed purchased from out-of-state suppliers. The out-of-state suppliers sell many of the same native wildflower species as Florida growers, but their wildflowers are not necessarily adapted to Florida's climate because the origin of their wildflowers can be substantially different from Florida's environment. The result is that wildflowers derived from Florida seed often perform better and/or are more sustainable than those derived from nonFlorida seed.

Florida Department of Transportation (FDOT) roadside vegetation specialists have noted the superior performance/sustainability of the Florida ecotype of Drummond Phlox compared to Drummond Phlox purchased from an out-of-state supplier (Dick Bush, William Moriaty; personal communications). Differences between Florida ecotypes and nonFlorida seed have

been noted for other species as well. The Florida ecotype of Lanceleaf Tickseed (*Coreopsis lanceolata*) flowered the first year after direct seeding whereas the common garden variety from commercial suppliers flowered only sporadically the first year after seed was sown (2). Florida ecotypes of Black-Eyed Susan (*Rudbeckia hirta*) and Blanketflower (*Gaillardia pulchella*) were more sustainable than that native to Texas when grown under low input conditions typical of roadside or meadow plantings (1, 2, 5). And in a 2-year study (3), Florida ecotypes of Lanceleaf Tickseed and Lyreleaf Sage (*Salvia lyrata*) initiated flowering and were in full bloom earlier and had lower incidence of disease compared to their nonFlorida counterparts; Lyreleaf Sage from Florida also had a greater survival rate.

A major market for Florida's seed is FDOT. In the past, they have purchased up to 20,000 lb per year (Gary Henry; personal communication), but that amount is only enough for 2000 roadside acres along the hundreds of state and federal miles for which FDOT is responsible. Other major markets in Florida include Water Management Districts, state and federal Forestry Services, parks, and those involved with restoration and reclamation.

Native wildflower seed production has excellent potential for Florida's small farmers as the average net return per acre for native wildflower seed production is $1500 (Les Harrison, Florida Dept. Agric. Cons. Serv. [FDACS], personal communication), with this rate expected to increase over time as production methods become more efficient. In 2003, there were six part-time, small farm producers in northern Florida. By early 2006, there were 18 growers, including the addition of a one large full time operation in Suwannee County begun by Ernst Conservation Seed of Pennsylvania. More small farm growers are expected to begin production over the next few years because of demand and efforts to promote native wildflowers and the industry. And although the industry is very young, the wildflower seed producers have formed a marketing cooperative, which yielded a profit in its first year of operation. The cooperative has received the backing of the Florida Wildflower Council, Florida Wildflower Foundation, FDOT, Florida Department of Environmental Protection, and FDACS. FDACS has committed to assisting the seed producers' cooperative by providing business-related expertise and advertisement via billboards and targeted radio, television, and magazines ads.

Lanceleaf Tickseed is one of the species being produced in Florida. It has indeterminate flowering lasting from April to first hard frost, so it must be grown on woven fabric mulch to realize substantial yields. Lanceleaf Tickseed is grown in rows formed by the 2- to 3-inch gaps that are left between parallel strips of landscape fabric. Seed is vacuumed off the fabric over several weeks during mid-spring to early summer. Yields average up to 200 lb per acre. Florida produced seed sold in 2004 for $55 per pound (bulk seed; purity >90%; <1% weed seed).

In one previous CCAP-funded project ("Native Wildflower Seed Production – Effects of Chemical Weed Control and Fertilization on Seed Yield and Quality of Phlox", 2003-04), weed interference was a significant problem and one of the major reasons for crop failure. A second CCAP-funded project Native Wildflower Seed Production – Establishing a Seed Production Planting of Phlox (*Phlox drummondii*) via Transplants, clearly indicated the success of using transplants for seed production. Unfortunately, the herbicide selected was too phytotoxic and resulted in reduced plant vigor and at times, plant death. However, the hand weeded plots produced seed until July 15, about one and a half months longer that typically occurs in a field or meadow situation. The injection of liquid fertilizer was somewhat effective but it was not outstanding. Apparently, Phlox is a heavier feeder than initially thought. In a recent study, we

showed that fertilizer rate was directly related to seed production of container grown Lanceleaf Tickseed (4). Supplemental fertilizer increased the number of flowers with a concomitant increase in seed production.

In a 2005 study at the NFREC-Quincy, the herbicide sulfentrazone was applied as a broadcast treatment about 1 week after liners of Lanceleaf Tickseed and two other species of wildflowers were transplanted into a landscaper fabric seed production plot. Although there was significant injury up to 4 weeks after application (WAA), by 12 WAA, only minor differences were apparent between the lowest sulfentrazone rate and the untreated controls. Weed control was dependent upon wildflower species and ranged from 80 to 90+%.

2. Objectives

a. Evaluate efficacy and phytotoxicity of chemical weed control in Lanceleaf Tickseed grown for seed production when plantings are established via transplants provided by a Gadsden County small farm grower-cooperator.

b. Evaluate effect of supplemental fertilizer on yield and quality of Lanceleaf Tickseed seed.

3. Approach Taken to Realize Objectives

The experiment was a complete factorial arranged in a split block design in a landscape fabric seed production system. In the landscape fabric system, wildflowers are typically planted in narrow rows created by leaving a narrow gap between parallel strips of landscape fabric. Main plots were fertilizer treatment (liquid fertilization at 32 lb N per growing season; nonfertilized) and three weed management regimes (nonweeded, Barricade, landscape fabric in between plants). There were five replications per treatment. Methods are detailed below.

On January 3, 2006, seed were sown on the surface of flats containing MetroMix 200 (Scotts-Sierra Horticultural Products Co., Marysville, OH). They were lightly covered (1–2 mm) with MetroMix 200 and placed in a glasshouse on a propagation mat (Pro-Grow Supply Corp., Brookfield, WI) that was set at 70^{o}F. Beginning January 12, seedlings were fertilized with 50 ppm N of Miracle-Gro All Purpose 15-30-15 + minors (Scotts Miracle-Gro Products, Inc., Marysville, OH). Single seedlings were transplanted to cell packs (1204; Cassco, Montgomery, AL) on February 2. On February 3, the seedling cell packs were given to Sandy Dutton, a small farmer in Havana, FL, to complete production of the liners in her nonheated greenhouse. (NOTE: Seedling production was not started at the Dutton farm because their greenhouse was not heated.) Liners were placed on a propagation mat (70^{o}F) and were fertilized once per week with 100 ppm N (same fertilizer as above) until March 8. On March 8, liners were brought to the NFREC-Quincy and fertilized with 100 ppm N of Miracle-Gro Bloom Booster 10-52-10 + minors.

Lanceleaf Tickseed seedlings were transplanted (1 ft on center) to the experimental production plots on March 9. Each plot (replication) was 10-ft long x 6 ft wide. Plots for the nonweeded control and herbicide treatment consisted of parallel strips of landscape fabric with a 3-inch gap between strips of fabric; this 3-inch gap constituted the row into which seedlings were

transplanted. For the third treatment, this gap was covered with landscape fabric, and 3-inch round holes (1 ft on center) were cut in the fabric (within the row) into which seedlings were planted. In this third treatment then, there was no soil exposed between plants. Drip tape (Ro-Drip®, 8 mil, 40 gal/hr; Roberts Irrigation Co., San Marcos, CA) was laid under the edge of the fabric immediately adjacent to the row. On March 31, Barricade (prodiamine) 4FL at 1 lb ai/A was applied over the top of seedlings using a CO_2 backpack sprayer that delivered 20 GPA via one Teejet XR 8001VHS tip (Spraying Systems Co. Wheaton, IL). Barricade was used instead of sulfentrazone because of concerns about the phytotoxicity of sulfentrazone. Plants were irrigated for 2 hours on March 10, and then twice per week (1 hr) for one month, and once per week (1 hr) thereafter. Beginning March 16, half the plants were fertigated weekly. Liquid fertilizer was applied using a Venturi-type injector that delivered 0.92 oz/week or 32lb N/A/yr (based on a growing season from mid-March to September 30 [29 weeks]). The liquid fertilizer used was a 10-30-20 (Bloom Booster soluble fertilizer + minors; Southern Agricultural Insecticides, Inc. Palmetto, FL).

Phytotoxicity was rated 12 days after treatment, and at 4 and 8 weeks after treatment (WAT). Weed control was rated 4 and 8 WAT. Seed harvest (2X per week) began on May 25. Wood strips were laid between adjacent plots to prevent seed migration between plots.

4. Research Results

No phytotoxicity was noted. Percent weed coverage was minimal so the number of weeds in each plot were recorded (Table 1). While there more weeds in the nonweeded control compared to the other two treatments, weeds in the nonweeded plots were not considered to be a significant problem and could be economically controlled by hand weeding. Fertilization had no effect on weed control. The main weeds present at 4 and 8 WAT were nutsedge, cudweed, oxalis, and Venus' looking glass.

Table 1. Number of weeds per 10-ft plot 4 and 8 weeks after Barricade (1 lb ai/A) was applied.

	Nonweeded control	Barricade	Solid fabric[z]
4	4.4 ± 1.1	1.5 ± 0.6	0.1 ± 0.1
8	2.3 ± 0.6	0.4 ± 0.2	0.3 ± 0.2

[z] No exposed soil between plants within a plot.

5. Accomplishments

We showed that in a typical landscape fabric seed production system typical used in Florida, no chemical weed control measures should be necessary, at least through spring, when growing Lanceleaf Tickseed. Seed harvesting began in late May and will continue through the summer.

6. Publications – None

7. Professional Presentations – None

8. Student Participation –Two college students

9. Conclusion

In a landscape fabric seed production system typical of that used in Florida, no chemical weed control measures should be necessary, at least through spring, when Lanceleaf Tickseed liners are transplanted in mid-March. Under these conditions, Lanceleaf Tickseed appears to be competitive enough with weeds such that the few weeds that do occur can be economically controlled by hand weeding. In addition, small farmers with a heated greenhouse would be able to supply Lanceleaf Tickseed liners ready for transplanting in March.

10. References

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