Native Wildflower Seed Production: An Alternative Commodity for Tobacco Growers

FINAL REPORT

Submitted by:

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May 2004

ACKNOWLEDGEMENTS

This project was primarily funded by the Florida Legislature through the Department of Banking and Finance Tobacco Settlement and Clearing Trust Fund, which was administered by IFAS/Extension to provide on-farm direct assistance to growers in the tobacco-producing counties affected by the state's tobacco liquidation. Additional funds were provided by the Florida Wildflower Advisory Council (FWAC). We gratefully appreciate the continued support of the FWAC and welcome the addition of the Office of Dean for Extension to the growing number of federal and state agencies, private organizations, and individuals who have taken leadership roles in promoting the use and production of native wildflowers in Florida. Florida's wildflower program has been and continues to be a cooperative effort.

EXECUTIVE SUMMARY

There is probably no single replacement crop for tobacco. Native wildflower seed is one crop that could play a meaningful role in helping to alleviate revenue losses in the tobacco-based economy in 20 northern Florida counties. There is a strong demand for native wildflower seed derived from naturally occurring Florida populations—commonly referred to as Florida ecotypes or Source Identified Seed. However, Florida's young native wildflower seed industry cannot meet current and projected demand for Florida ecotype seed.

Native wildflower seed production plots were established by four farmers whose families possess a tobacco allotment. A fifth tobacco farmer served as a liaison between the growers and project coordinators and oversaw the day-to-day grower activities. All crops were produced at no cost to participants. In addition, all growers received stipends. Goldenmane Tickseed (*Coreopsis basalis*) was established by seed in a broadcast planting while Buffalo Clover (*Trifolium reflexum*) and Leavenworth's Tickseed (*Coreopsis leavenworthii*) were established as row crops using liners produced by two tobacco farmers that each received a greenhouse as part of this project. Goldenmane Tickseed was the most profitable crop because fewer inputs were required compared to the row crops. Those establishing row crops for seed production should strongly consider purchasing transplants rather than producing their own unless a greenhouse can be utilized for other crops throughout the year.

Other activities designed to facilitate native wildflower seed production in Florida's tobacco counties included:

- Seed production workshop for county agents, growers, and potential growers
- Tour of the demonstration plantings
- Seed production guide for Goldenmane Tickseed
- Guide for the end users of native wildflower seed
- Economic analysis of seed production and the outlook for the industry
- Purchase of seed production equipment available to growers

As a direct result of this project, two of the tobacco participants acquired enough training and knowledge to remain involved with native wildflower seed production beyond this project. One of the participants will continue to produce native wildflower seed while the project liaison established a seed production field in fall 2003 for 2004 harvest.

RATIONALE

There is probably no single replacement crop for tobacco. However, native wildflower seed is one crop that can play a significant role in helping to alleviate revenue losses in Florida counties that rely heavily on a tobacco-based economy. There is a strong demand for native wildflower seed derived from naturally occurring Florida populations—commonly referred to as Florida ecotypes or Source Identified Seed (see below)—but Florida's fledgling native wildflower seed industry cannot meet current and projected demand. Florida ecotype wildflower seed has potential as a high-value crop. Depending on species, Florida growers are currently receiving $30–100 per pound, with typical yields of 20–60 pounds per acre. Moreover, the Florida Department of Transportation, the current largest buyer of wildflower seed (native or otherwise) in Florida, has recently adopted a policy that clearly states their preference for purchasing and using Florida ecotype seed "to the extent quality seed is available" (Wildflower Program; Environmental Mgmt. Office, Topic No. 650-030-001-g; March 18, 2004). Other large land management agencies, such as Water Management Districts, along with private companies that must reclaim large areas of land also have expressed strong interest in purchasing Florida ecotypes of native wildflower seed.

Florida Tobacco-Producing Counties

Alachua	Jefferson
Baker	Lafayette
Bradford	Levy
Columbia	Madison
Dixie	Marion
Gadsden	Nassau
Gilchrist	Sumter
Hamilton	Suwannee
Holmes	Taylor
Jackson	Union

Source Identified Seed is a phrase used nationwide. The Southern Seed Certification Agency in Auburn, Alabama—a joint Florida-Alabama agency—classifies Source Identified Seed as pre-variety germplasm "…where no selection or testing of the parent population has been made, produced as to ensure genetic purity and identity from either: a. Rigidly defined natural stands or seed production areas, or b. Seed fields or orchards…". The state and county where the seed was first collected from the wild are stated on labels of Source Identified Seed.

OBJECTIVES

The original objectives of this project were:

- Demonstrate that native wildflower seed is an economically viable crop
- Develop a complete production, post-harvest processing and marketing system that will generate economies of scale to make this crop viable.

PARTICIPANTS

PROJECT COORDINATORS

University of Florida/IFAS

Jeff Norcini, PI	North Florida Res. & Edu. Center, Quincy
Ann Blount	North Florida Res. & Edu. Center, Marianna
Larry Halsey	Jefferson County Coop. Extension Service
Ken Quesenberry	Agronomy
Mickie Swisher	Family Youth & Community Services
Mike Talbot	Agricultural & Biological Engineering
Bill Thomas	Columbia County Coop. Extension Service
Allen Tyree	Hamilton County Coop. Extension Service

Florida Department of Agriculture & Consumer Services

Nelson Mongiovi	Division of Marketing and Development
Les Harrison	Division of Marketing and Development
Kim Humphrey	Division of Marketing and Development
Colleen Trent	Division of Marketing and Development

Other Organizations and Businesses

Lacy Bullard	CATALYST, Tallahassee
Gary Henry	Florida Wildflower Advisory Council
Terry Zinn	Wildflowers of Florida, Inc., Alachua

TOBACCO COUNTY PARTICIPANTS (*Tobacco Allotment)

Langdon Kirby*, Project Liaison	Columbia County
Stamps/Wanda Chandler*	Hamilton County
Bill Copeland	Alachua County
Brian Crews*	Columbia County
Charles Davis*	Alachua County
Roger Davis*	Alachua County

APPROACH AND OUTCOMES

SEED PRODUCTION DEMONSTRATIONS

Native wildflower seed production plots (up to 2 acres) were established by four farmers whose families possess a tobacco allotment. Bill Copeland, who is not a tobacco farmer but lives in Alachua County, planted 1.25 acres of Annual Phlox (*Phlox drummondii*), and Terry Zinn, one of the project coordinators planted a 500-ft row of Buffalo Clover. In addition, two of the tobacco farmers, Roger Davis and Stamps/Wanda Chandler, each received funds to construct greenhouses (Fig.1a, b) in which to raise wildflower transplants for this project (Fig. 2; Table 1, 2), and subsequently any other species except tobacco. Both greenhouses were identical. The species planted in seed production fields were all Florida ecotypes (Table 3):

Goldenmane Tickseed (*Coreopsis basalis*)
Seed origin – Alachua County; seed produced by Terry Zinn
Leavenworth's Tickseed (*Coreopsis leavenworthii*)
Seed origin – Orange County; seed produced by Joe Melton, Dade City, FL
Buffalo Clover (*Trifolium reflexum*)
Seed origin – see Table 1; Accession 25 was the only one grown for seed production; others just were grown for transplants for K. Quesenberry and T. Zinn

Table 1. Origin of Buffalo Clover germplasm.

Florida acc. no.	Accession ID no.[z]	Origin (county, state)	AHS Heat Zone[y]	USDA Cold Hardiness Zone[x]
3	PI 561111	Oktibbeha, MS	8	7b
6	PI 516400	Hardin, TX	9	8b
6W	PI 516400	Hardin, TX	9	8b
10	G 31453	Rusk, TX	8/9	8a
25	TR 25	Jackson, FL	9	8b
27	TR 27	Decatur, GA	9	8b

[z] U.S. Dept. Agric., Agric. Res. Serv. The National Plant Germplasm System. http://www.ars-grin.gov/npgs.
[y] American Horticultural Society Heat Zone map.
[x] U.S. Dept. Agric., National Arboretum, Plant Hardiness Zone map.

Transplant Production

Leavenworth's Tickseed liners were produced by Roger Davis (Table 2). Flats (290 cells per flat) were seeded in early January 2003. Seed were mixed with vermiculite, and this mixture was planted into the top ¼" of the cells that had been filled previously with a soilless medium. Buffalo Clover liners were produced by Stamps and Wanda Chandler (Table 1, 2) in similar flats. Prior to sowing, seed were treated with an inoculum designed specifically for Buffalo Clover (Nitragin Company, A Division of Liphatec, Milwaukee, WI).

Table 2. Native wildflower transplant production.

Grower	Species	Cells / flat	Number produced
Chandler	Buffalo Clover	128	~38,000
R. Davis	Leavenworth's Tickseed	290	~13,000

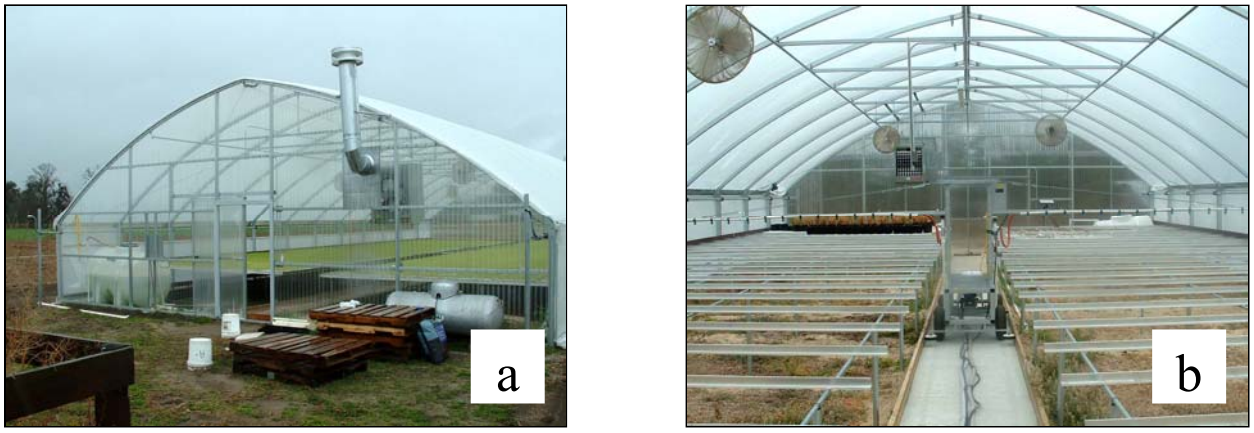

Figure 1. Exterior (a) and interior (b) of greenhouses erected at the Davis farm in Alachua County and the Chandler farm in Hamilton County.

Figure 2. Buffalo Clover transplants, Nov. 11, 2002.

Figure 3. Goldenmane Tickseed seed production field, May 1, 2002.

Table 3. Native wildflowers established in seed production plots.[z]

Grower	Species	Estab. method Field type	Acres	Harvest method	Yield (lb)
Chandler	Buffalo Clover (#25)	Transplant / Row	0.75	Combine	1.25[y]
C. Davis	Buffalo Clover (#25)	Transplant / Row	0.5	---[x]	N/A
R. Davis	Leavenworth's Tickseed	Transplant / Row	0.25	---[x]	N/A
B. Crews	Goldenmane Tickseed	Seed / Broadcast	2.0	Combine	65
T. Zinn	Buffalo Clover (#25)	Transplant / Row[w]	~0.07[w]	Vacuum	9

[z] Bill Copeland established a 1.25 acre plot of Annual Phlox; however, he was not able to maintain his planting since he was called up for active military duty.
[y] Most seed were shed before harvest or dropped out of the combine.
[x] Excessive weed growth precluded seed harvest.
[w] Terry Zinn, one of the project coordinators, planted about 1000 seedlings in a 500-ft. row between two 3-ft strips of landscape fabric; seed were vacuum harvested.

ECONOMIC ANALYSES AND OBSERVATIONS

NOTE: Because of no or poor yields for Leavenworth's Tickseed and Buffalo Clover (Table 3), 2002 production data was included to provide insight into the costs associated with wildflower seed production. Most of the information in this section was written by Les Harrison. The Goldenmane Tickseed summary (Table 7, and supporting text) was written by Jeff Norcini.

Industry Status

Florida wildflower seed production and marketing is in its infancy. Acreage committed to this crop group is still very small, especially when compared to established western states. Several native species have come to the production forefront but cultural practices and harvesting techniques are still in development. There are few standardized methods to bring a crop from inception to market. As such, crop failure or unusable seed resulting from weed seed contamination are not unusual.

Marketing channels are equally primitive for Florida's wildflower seed producers. Public venues for wildflower seed are dominated by established companies who have long standing relationships with wholesalers and retailers. The bulk of established growers are located in the western United States. Some seed is currently being imported. An array of packaging choices, merchandising program, and marketing channels are in place and functioning for these businesses.

By comparison, Florida's growers have no retail opportunities, and few wholesale outlets. However, the state's growers have several unique circumstances to build upon in the market place. The combination of strengths and weaknesses are as follows:

Strengths

Seed quality and acclimatization is a major positive feature of Florida grown wildflower

seed when selling to in-state customers. By means of natural selection, in-state produced seed are ready for Florida's soils and weather. Seed produced in difference climate zones and/or soil types will suffer a natural winnowing. Temperature variation, chill hours, humidity, soil ph, and soil/organic matter ratio all have an effect on seed viability. Seed morbidity, mortality, and vigor reduce exponentially as temperature and soil parameters broaden from the state's norm.

Production flexibility of Florida's growers is in direct proportion to their specialized assets. In other words, small producers with fewer capital assets committed to specialized production and processing equipment are more likely to change seed species in response to market conditions. Conversely, growers with a high ratio of specialized equipment will find it difficult to switch species when market demand shifts.

Marketing in a cooperative, especially the new-generation wildflower growers' cooperative, gives the small producers the merchandising power of larger growers without the capital commitment. New generation cooperatives contract with their members for a set amount of product to market each crop cycle. In turn, the cooperative may contract with a buyer for a specific quantity at a specific price.

Weaknesses

A sudden reduction in demand can create marketing problems for any producer. In the case of wildflower seed producers, the problem is acute due to the perishable nature of their product. Seed viability can decline become nonviable and eventually rendered valueless. With market decline, the seed must be sold at salvage value or the grower will risk total loss. Growers in the western United States endured radical market demand swings in the 1990's. Wildfires, changing governmental seeding policies and weather vagaries cause supplies and prices to shift dramatically. A major Florida outlet for wildflower seed has been the Florida Department of Transportation. A shift in administrations or tax revenues could prove damaging to growers.

Crop failures can occur with any agricultural commodity but new enterprises are especially susceptible. Lack of cultural knowledge and threat awareness by producers contribute to the probability of failure from environmental factors. The possibility of crop failure will be reduced as more data is developed.

Limited marketing resources of Florida's growers have, to date, limited their impact in the market place. A mutual marketing effort in conjunction with the Florida Department of Agriculture and Consumer Service's, Division of Marketing and Development could help to alleviate this deficiency. The Department's marketing staff can develop packaging concepts, point of purchase materials, and marketing contacts.

Production Economics

The following data is based on a 2-year data collection project. North Florida growers have shared their records for the purpose of developing baseline data for specific wildflower seed varieties. The cultural practices, while not conducted in a controlled environment, reflect actual practices. Cost for capital assets are prorated over the life of the asset with labor cost valued at current market value. Returns on seed sales (2002 seed prices) were as reported by the participants.

2002 Data

Goldenmane Tickseed was the most frequently grown wildflower crop in 2002, and the most profitable species. Leavenworth's Tickseed, Annual Phlox, and Black-Eyed Susan (*Rudbeckia hirta*) were also grown (Table 4).

Table 4. Wildflower seed production cost analysis–2002.

	Total gross receipts	Net enterprise receipts	Net return per acre
Grower 1	$19,250	$8,471	$2,420
Grower 2	$28,500	$17,687	$505
Grower 3	$40,000	$35,420	$2,952
Grower 4	$7,500	$2,750	$275
Average	$23,812	$16,082	$1,538

The average return on investment was almost 68 percent but ranged from 36 percent to nearly 89 percent. These percentages will drop as greater capital investment is placed in on-farm assets and increasing supplies of seed drive sales returns down.

2003 Data

In 2003, two identical greenhouses were purchased for use in the Tobacco-Wildflower Seed Production Project. The concept being tested was for seedlings to be started in the greenhouses and then transplanted to fields for grow-out. Theoretically, the seed stock would get an earlier start and the growing season would be lengthened.

One greenhouse was used to produce Leavenworth's Tickseed and the other to produce Buffalo Clover. Cost for the greenhouses was prorated based on a 20-year life span. The curtains and plastic sheeting was prorated over 4 years. Ten percent per annum was added for maintenance cost. Variable input costs were calculated as reported and labor was assigned a value of $9.00 per hour.

The Buffalo Clover crop yielded 10.25 pound of seed from two plots (Table 5). Problems with harvesting

Table 5. Buffalo Clover seed production cost analysis.

Inputs	Units	Unit value	Cost
Land – rent	1.5 acres	$50	$75
Labor – greenhouse	24	$9	$216
Labor – field	35.25	$9	$317
Greenhouse	1	$1,707	$1,707
Fertilizer	200	$.25	$50
Site preparation – field	1	$1,250	$1,250
Greenhouse inputs	1	$229	$229
Irrigation annualized*	1	$2,350	$2,350
Growing plastic 3' x 2000'	2	$26	$52
Seed harvest	1.5	$10	$25
Seed cleaning	10.25	$2	~$21
Storage	6	$64.20	$193
Seed test	1	$35	$35
Total production expenses			$6,520
Yield (lb)	**10.25	$80	$816

* Dollar value taken from a previous study.

** 1.25 lb was harvested for Chandler (most of seed shattered before harvest); 9 lb was harvested for Zinn, which was from a single 500-ft long X 6.5-ft wide (3250 ft^2) row (equivalent to 120 lb/A).

techniques, harvesting too late, and deer predation substantially reduced yields in the Chandler plot. The Leavenworth's Tickseed crop was not harvested (Table 6). The crop was described as too weedy for harvest.

Goldenmane Tickseed was grown on a 2-acre plot. It was the most profitable crop (Table 7) of the three species planted because it was established by seed and it is not normally irrigated, thereby eliminating over $4000 of production costs (Table 5, 6). As of early 2004, growers were receiving $30/lb for seed of Goldenmane Tickseed. Since this species easily reseeds itself, there should be no need to reseed the original planting. Moreover, site preparation costs should be reduced substantially in 2004 and beyond. These cost savings will help to maintain profitability of this crop. Since this species is the one in greatest supply—and supply is expected to increase—a slight drop in price could occur within the next few years if efforts are not made to facilitate an increase in demand.

Conclusions

While the cultural practices and species selection for wildflower seed production has progressed in the last few years, the enterprise has not reached a state of economic independence. Further development of standard practices will increase the likelihood of a successful crop, and make wildflower seed production a viable enterprise for the small farmer.

Table 6. Leavenworth's Tickseed seed prod. cost analysis.

Inputs	Units	Unit value	Cost
Land – rent	1.5 acres	$50	$75
Labor – greenhouse	21	$9	$189
Labor – field	38	$9	$342
Greenhouse	1	$1,707	$1,707
Fertilizer	200	$0.25	$50
Site preparation – field	1	$100	$100
Greenhouse inputs	1	$229	$229
Irrigation annualized*	1	$2,350	$2,350
Growing plastic 3' x 2000'	1	$26	$26
Total production expenses			$5,068
Yield (lb)	0	$50	$0

* Dollar value taken from previous study.

Based on these cost analyses, tobacco farmers wanting to produce wildflower seed should:

1. Use an existing crop irrigation well. Although it would not eliminate the annualized cost for irrigation, it would reduce it substantially.
2. If using transplants to establish a planting, liners should be purchased rather than investing in a greenhouse to only produce wildflower liners. Using the greenhouse to produce other crops throughout most, if not all, of the year would substantially reduce the annualized cost for wildflower liners.
3. Goldenmane Tickseed established via seed in a broadcast planting is currently the most profitable crop. However, since seed of this species is in greater supply than any other one in Florida, value of this crop might decline slightly over the next few years. Maintaining the profit margin for this species will require more efficient production practices as well as good marketing to increase demand.

Table 7. Goldenmane Tickseed seed production cost analysis.

Inputs	Units	Unit value	Cost
Land – rent	2 acres	$50	$100
Labor – field	3	$50(est.)	$150
Fertilizer	2	$17	$34
Site preparation – field	4 (est.)	$62.50	*$250
Seed	3.5	$30	**$105
Sow seed	2	$50	**$100
Harvest seed (combine)	2	$50	$100
Clean seed	65	$1	$65
Seed test	1	$35	$35
Seed storage	6	$64.20	193
Total production expenses			$1,132
Yield (lb)	65	$30	$1950

* Site prep costs will be substantially less in 2004 and later unless acreage is expanded.

** Plants reseed so these are one-time costs. However, per acre cost will remain the same if acreage is expanded.

EDUCATIONAL ACTIVITIES

In-Service Training

Native Wildflower Seed Production (IST 23012) – NFREC-Suwannee Valley, May 28, 2003
30 attendees, including 11 County Agents)

This program was designed to provide agents with enough information about native wildflower seed production and Florida's seed production industry to enable them to 1) assist current and potential growers in Florida's small but expanding wildflower seed production industry, and 2) utilize the knowledge gained in this training in their own programming. Growers, including those involved in this project, as well as several of the Project Coordinators also attended.

Topics included current recommended native wildflower seed production practices, status of the industry, and economics. In addition, there were demonstrations of wildflower seed drilling and seed cleaning equipment.

Tour of Demonstration Plots

Wildflower Seed Production Demo Tour – Alachua County, May 29, 2003
31 attendees, including County Agents

Project Liaison

Langdon Kirby's primary responsibilities were to serve as a liaison between the tobacco county participants and the Project Coordinators, to oversee day-to-day activities of the tobacco participants, and to provide assistance to the participants as needed. He did an admirable job as Project Liaison and his help was deeply appreciated.

Training activities. Langdon, along with Kim Humphrey of FDACS, visited the USDA, NRCS Plant Materials Centers in Elsberry, MO and Coffeeville, MS in September 2002. Personnel at these PMCs have extensive experience in native wildflower seed production, albeit in a noncommercial environment. They learned about all aspects of seed production including planting, harvesting, drying, seed cleaning, and storage. Langdon gained additional training about seed production by visiting Wildflowers of Florida, Inc. (Alachua County), conversations with Project Coordinators, participating in Tobacco Education Project and wildflower seed producer co-op meetings, attending the In-Service Training and Demonstration Tour, and by assisting the tobacco participants with different aspects of production.

Impacts

- Langdon learned enough about seed production and the industry to establish his own production plot of Annual Phlox.
- Given Langdon's farming background and the knowledge he gained about seed production, he should be able to provide guidance to new growers.
- Langdon plans to join the co-op in 2004.
- While Langdon considered this project a success, he thought it would be "hard to convince other tobacco growers that seed production could be a profitable business, because of the timely weed control process" as well as the "seed drying and cleaning" practices required.

Publications

The information generated in this project along with that from other projects led to the publication of one seed production guide:

- Norcini, J.G. 2003. Seed production of goldenmane tickseed. Fla. Coop. Ext. Serv. Pub. ENH 882.

  NOTE: Publication of a general seed production guide was not necessary as the USDA, NRCS Plant Materials Center, Brooksville, FL published "Florida Native Seed Production Manual" in 2002. Moreover, a seed production guide for Leavenworth's Tickseed was published in fall 2002 (Norcini, J.G. 2002. Seed production of Leavenworth's tickseed. Fla. Coop. Ext. Serv. Publ. ENH 868).
- Norcini, J.G. and J.H. Aldrich. 2004. Establishment of native wildflower plantings by seed. Fla. Coop. Ext. Serv. Publ. ENH 968.
- This final report will be posted on the NFREC web site (http://nfrec.ifas.ufl.edu/norcini).

SEED MARKETING

In February 2002, with the assistance of FDACS, wildflower seed producers formed a 'new generation' marketing cooperative (http://floridawildflowers.com). Brian Crews, one of the

tobacco participants, currently serves as Executive Vice President. Terry Zinn, one of the project coordinators, serves as an advisor.

USE OF EXISTING TOBACCO FACILITIES

NOTE: Information and images in this section were based on a draft report and notes provided by Mike Talbot.

Tobacco curing barns have sufficient air flow and heater capacity for drying of wildflower seed. The heater capacity is much greater than required for wildflower seed and some control modification may be necessary. These barns use a batch drying system in which tobacco is secured in racks or boxes which are loaded into the barns. The major modification for wildflower seed would be to add metal screens with small openings to drying containers, the size of racks or boxes, to prevent the seed from being blown out of the drying zone. For less than full loads, baffling will be needed to insure the air flow passes through the flower seed rather than by-passing. A major concern with this application is the potential of transferring odors from the other crops to the tobacco leaves.

A number of design approaches were considered. The simplest use of the tobacco barn for drying wildflower seed would be to place fine mesh seed drying bags containing the wildflower seed on the floor of the tobacco barn. Floor area not covered by drying bags could be covered with plywood or metal sheets to prevent drying air bypass. The drying unit could be operated at a temperature below 95^{o}F and with the existing fan. A more complex design could involve extensive modification of the tobacco barn. Drying beds similar to grass seed dryers used in Florida could be erected. These wood framed beds with screen floors would be sloped to the angle of repose of the wildflower seed. These beds would be along each side of the length of the tobacco barn sloping to a middle conveyor. A door in the lower side of the sloped drying bed would be opened to allow the seed to flow onto the conveyor belt after the completion of drying.

Other ideas were considered with concern for drying effectiveness, labor intensiveness, material handling efficiency and scale of seed production, as well as economics. After discussions with tobacco farmers and wildflower seed growers, concerning various methods to use the tobacco barns for drying wildflower seed, a modular approach for using the tobacco barns was adopted.

The smallest modular component was a drying bin with metal sides and stainless steel mesh bottom and tops (Fig. 4). The top is hinged to allow placement and removal of wildflower seed. The second modular component was a metal frame the same dimensions of a standard tobacco barn rack. Two of the drying bins slide into a rack size frame (Fig. 5). This combination of frame and two

Figure 4. Drying bin prototype.

bins could be used in a rack style tobacco barn. For less than a full barn load, plywood or metal sheets would be used to block the rack space that did not contain drying bins with wildflower seeds.

Figure 5. Two drying bins in frame in tobacco box barn.

Figure 6. Four frames with two bins per frame.

The next modular component required modification of a standard tobacco barn box (Fig. 5) to allow four rack sized frames with two drying bins each to be mounted per each tobacco box (Fig. 6). The tobacco boxes could be loaded and unloaded with special equipment that the tobacco farmer currently used for this purpose. Plywood or metal sheets could be used for boxes that did not contain the drying racks with drying bins of wildflower seed. For small scale operations, only the first few boxes near the tobacco barn door would be used while the other boxes would be fitted with plywood or metal sheets and remain in position.

The cost of the prototype system for one box (four rack frames with eight drying bins) was approximately $2,500 not including a tobacco barn box. This included purchase of a spot welder and stainless steel mesh for the screen on the top and bottom of the bins. Most of the other components used were also stainless steel and a majority of the metal came from existing shop supply rather than new purchase. Labor was not included. Use of plywood and non-stainless steel metal would reduce cost substantially. The component life would probably be less, or from an economic view, a high initial cost would result in less maintenance cost (wear and tear), while a reduced initial cost would result in more maintenance cost to maintain the drying bins and frame. The fine screen used for the bottom and top of the drying bins is expensive. Use of a less fine mesh (perhaps hardware cloth) in combination with seed drying bags could further reduce the drying bin cost.

A final use of the modular system is that one or more of the drying bins and rack size frames could be used with a stand alone dryer (Fig. 7). The fan would direct air to the bottom of the drying bin(s) with flexible or rigid ducting. This would be useful for small scale wildflower seed producers. If a tobacco barn were available, the stand alone dryer and drying bins could be operating inside the tobacco barn. The tobacco barn fan could remove the moist air created by

the stand alone dryer operations in addition to providing shelter from rain and other inclement weather.

Figure 7. Stand alone dryer – Model BKP 100, Heat Pipe Technology, Inc., Gainesville, FL.

EQUIPMENT PURCHASES TO FACILITATE DEVELOPMENT OF SEED INDUSTRY IN TOBACCO COUNTIES

- Wildflower Seed Drill
- SeedTech Air Density Separator

IMPACTS

Direct

Because of this project, two of the five tobacco participants have decided that native wildflower seed is a source of revenue that can help alleviate financial losses due to the downturn in the tobacco industry.

Outlook

As Florida's young native wildflower seed production industry expands, related support industries could develop within farm communities. Currently the best opportunities are for combine harvesting, seed processing, and ecotourism. State, local and regional government agencies and private land managers will benefit from improved land management associated with using native wildflowers.

Besides an increased local tax base and improved personal income, larger statewide benefits integral to the industry can also be developed. Texas, which developed its wildflower program through agricultural assistance, reports a very positive ecotourism impact when the Texas Bluebonnets and other wildflowers bloom. Wildseed Farms in Fredericksburg, a rural community 65 miles from Austin, has developed into an ecotourist attraction centered on wildflowers. The opportunity for ecotourism also exists in Florida's tobacco counties. The wildflower seed production industry is centered in these counties, there are many large, localized stands of wildflowers in fields and along roadsides, and roadside populations along state roads throughout most of these counties are well-managed by FDOT.

While this pilot project focused on the tobacco-producing areas of north Florida, it will be applicable and replicable in other rural areas of the state where environmentally compatible economic development is critically needed to supplement per-capita income.