Survey of Sustainable Seed Harvesting, Conditioning, and Storage Methods for Florida *Liatris*: Interim Report, October 2011

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Objectives:

1. **Development of Access 2007 database on Seed Harvesting, Conditioning, and Storage Methods for *Liatris***
   Google scholar and general google search was conducted for papers or reports dealing with seed production and processing in the genus *Liatris*. Electronic copies were captured and filed. Material not available on line was requested from National Agriculture Library. As of yet, this material has not been organized in a database. Further searches and communication with native seed producers will be conducted prior to the final organization of this material.

2. **Evaluation of Selected Seed Processing Methods and Storage Conditions on the Germination of Florida *Liatris* spp.**
   A total of 16 *Liatris* accessions from Florida were collected or received as a donation (Ernst Conservation Seeds, Meadville, PA: 9061060, 9061061, and 9061062) in the late fall/early winter of 2010. The seed originated from 11 counties in the state (Collier, Franklin, Hillsborough, Highlands, Jackson, Leon, Santa Rosa, Suwannee, Wakulla, and Walton) and represented six *Liatris* species (*chapmanii*, n=2; *elegans*, n=6; *garberi*, n=1; *gracilis*, n=2; *spicata*, n=2; and *tenuifolia*, n=3). Samples were stored at room temperature in permeable paper or cloth bags until cleaned (May 17-June 2).

   Figure 1. Hand collected *Liatris* seed heads and stalks before processing. Hand stripped material from this is Class 1 seed.

   At the time seed lots were cleaned, three accessions were not used due to insufficient material. One of the larger seed lots (9061060; Fig. 1) was used as the test material and screen sizes and equipment speed was varied to arrive at what

was judged the best for each class of seed based on visual observation. Briefly, the procedure used for each individual lot of seed was to take a bulk weight and then a hand stripped subsample (Class 1, HS: seed that had fallen off the stems and some that was pulled of the stems) was collected first in quantities deemed sufficient to complete all storage condition and time combinations as outlined in the protocol.

The remaining material was then run through a hammer mill (C.S. Bell Manufacturing Company, Tiffin, OH: 724 rpm, ½" round hole screen) to simulate seed conditions when collected by a flailvac (Class 2, HM; Fig. 2). A subsample was then collected for storage condition and time studies.

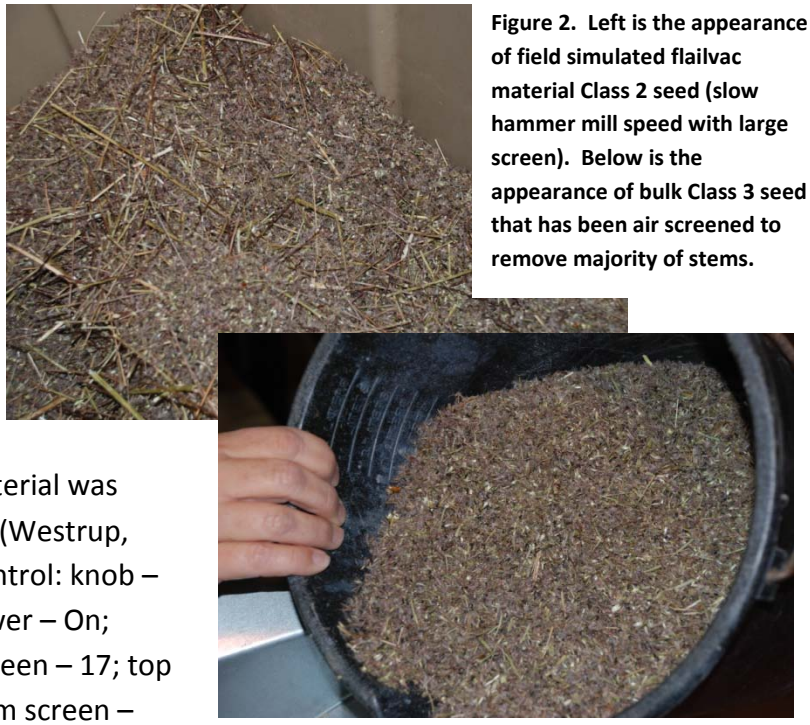
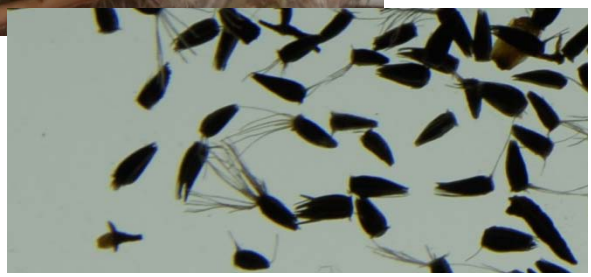


Figure 2. Left is the appearance of field simulated flailvac material Class 2 seed (slow hammer mill speed with large screen). Below is the appearance of bulk Class 3 seed that has been air screened to remove majority of stems.

The remaining hammer milled material was processed through LA-LS machine (Westrup, Inc., Slagelse, Denmark; speed control: knob – 7.5 and digital readout – 401; blower – On; hopper vibration – 6; pre-clean screen – 17; top screen – 10 round (12/64"); bottom screen – 50X50; top air control – 2.75; bottom air control – 3; back air control – 1.5; seed collected from upper box). A subsample of this material was collected for further storage temperature and time studies (Class 3, AS; Fig. 3).

Figure 3. Class 3 seed with pappus (left) compared to Class 4 seed (below) after debearding hammer mill procedure and further air separation.



The remaining seed from the air separation process was then run back through the hammer mill to debeard the material (811 rpm, 1/8" round hole screen) and then the seed was processed two times, through the LA-LS machine (speed control: knob – 7.5 and digital readout – 401; blower – On; hopper vibration – 4; pre clean screen – 9; top screen – ½"; bottom screen – 6X28 slotted; top air control – 2.75; bottom air

control – 3; back air control – 1; seed collected from back seed box). A subsample of this seed (Class 4, DB w/HM; Fig. 3) was collected for storage condition and time studies.

Zero time germinations (AOSA Journal Seed Technology Rules for Testing Seed: *Liatris* sp. – 100 seeds, on top of blotter paper, H_2O, lights, $20^o/30^o$ temperature alternating, first count 7 d, ending at 28 d, 4 replicates) for each processing class of seed for each accession were started on June 13-17. On July 1, a subsample of each of the processing classes for each accession were placed in the three storage conditions (room temperature, seed storage facility, and freezer) with temperature data loggers.

Means for the zero time germinations are shown in Table 1. Accessions shown in red are not being used in storage study due to insufficient quantities of processed seed. Germination of accession 9061060 (orange) was low due to immature seed and it also was dropped from the remainder of the study. Final species count for the storage study is eight (*chapmanii*, n=1; *elegans*, n=2; *garberi*, n=1; *gracilis*, n=1; *spicata*, n=1; and *tenuifolia*, n=2).

Although the results have not been statistically analyzed yet, on average seed processing did not appear to affect initial germination. Germination across all seed lots and processing treatments ranged between 39.25 to 44.17%. The means do suggest a species by seed processing interaction. This was particularly obvious with the 9061036, which had a dramatic drop in germination after debearding. This accession is a *spicata,* a species known to have larger seeds. The first quarterly germinations on the stored seed will be started in October 2011, the results will provide a better understanding of the effects of the different seed processing operations on seed quality.

Table 1. Zero time germinations for the *Liatris* study

Accession	Species	Class 1 (HS)	Class 2 (HM)	Class 3 (AS)	Class 4 (DB w/ HM)	Mean
9061032	chapmanii	66.5	70.75	64.5	81.75	70.88
9061034	chapmanii	32.7	26.75	25.5	38.75	30.93
9061030	elegans	42.5	35.5	26	17.25	30.31
9061035	elegans	40.0	43.5	43.25	39.75	41.63
9061038	elegans	42.0	35.25	30.5	49.75	39.38
9061061	garberi	62.5	62.75	62.25	78	66.38
9061056	gracilis	27	27.5	23.75	54	33.06
9061062	gracilis	50.25	56.75	50.75	47.5	51.31
9061036	spicata	33.75	36.25	33.75	9	28.19
9061060	spicata	5.5	6.25	6.75	0	4.63
9061028	tenuifolia	58.5	59.26	28.25	37	45.75
9061031	tenuifolia	64.5	58.5	58	42.25	55.81
9061033	tenuifolia	55.5	52.5	57	43.25	52.06
	Mean	44.71	43.96	39.25	41.4	