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Native Warm-Season Grass Seed Production

Harvesting native warm-season grass (NWSG) seed is a specialized operation. NWSGs produce small amounts of seed when compared to common cool-season grass species. Difficulties of seed production include inconsistent maturity, susceptibility to seed shattering, and limited weed control options. Recent droughts and high fertilizer prices have led many livestock producers and conservationists to consider replacing existing cool-season species with NWSGs. The difficulties faced producing NWSG seed and steady demand could create profitable opportunities for owners of established NWSG stands to harvest seed.

Managing for seed

NWSGs are predisposed for stand longevity in a natural environment with no added fertility. When a stand is fertilized, forage yield increases but seed production remains the same. Native plants were not bred to increase seed yield from fertility boosts. In some scenarios, seed yield may decrease due to the plant's aggressive vegetative growth if fertilized. Seed harvest can begin one full growing season after the establishment year. However, it is recommended that NWSG stands are allowed to reseed themselves at least once every three years to maintain stand vigor.

Harvest timing

Timing of harvest varies by species and weather conditions. Typically, most NWSGs will be ready for seed harvest in late summer or early fall. Since native grasses have not been improved to reduce seed shattering, catching the crop at the proper stage is essential for a good seed harvest. Each NWSG species displays slightly different indicators of maturity. A common test for NWSG seed maturity is to strike the seedhead against your hand. If there is noticeable shattering, then the seed is ready for harvest.

Harvest methods

There are a variety of methods used to harvest NWSG seed. Susceptibility to shattering makes conventional harvesting equipment less ideal for some NWSG species. Sensitive crops must be hand harvested in most scenarios. In this case, a laborer will walk through the field with a plastic hair comb and a bucket attached to their waist and comb seed into their bucket. A similar mechanized harvest method is a brush stripper. Brush strippers are usually mounted to a tractor with a front-end loader. Brush strippers work by rotating against the direction of travel to rake the loose seeds from the plant. The detached material from the stripper head falls in a holding bin at the rear of the unit. Stripper brushes produce a much cleaner sample than a combine since the entire stem of the plant is not cut. An example a brush stripper can be seen in Figure 1. Handheld brush strippers are also available as attachments to common landscaping tools like power trimmers.

Figure 1. A loader-mounted brush stripper can be an effective way to harvest NWSG seed. Photo courtesy of Tannas Environmental Services.

Table 1 shows the harvesting and processing costs associated with using a loader-mounted brush stripper.

Seed less prone to shatter can be harvested by a combine. With a combine, growers must ensure that

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they are maximizing the amount of harvestable seed when they cut. This is because seedheads will be destroyed during combining and immature seed will travel out of the combine with the tailings. If seed is too mature, the sickle's rapid movement will cause seed loss. Seed recovery percentages and combine settings vary by species. The Native Seed Production Manual (PDF) (tallgrassprairiecenter.org/sites/default/files/native_seed_production_manual.pdf) has information on combine settings for NWSG seed harvest. Table 2 shows harvest cost estimates from a combine.

Seed handling

After seed is harvested, careful handling is needed to prevent spoilage and maintain the germination rate. Harvest usually occurs when seed is too wet for storage to reduce shattering loss. Unlike commodity grains, grass seed does not respond well to forced air drying in deep storage such as a grain bin. Suggested drying practices are to spread the seed out in a thin layer not more than 6 inches deep over a perforated floor. Seed should have air gently applied until it is cooled to a temperature and humidity not exceeding a sum of 100 for optimal storage. For example, 50 degrees Fahrenheit and 50% humidity are safe storage conditions. Stir seed semi-weekly for the best drying conditions.

Marketing

Many NWSG seed producers will sell their crop to a seed company. In this arrangement, the buyer of the seed assumes the responsibility of cleaning, testing, bagging, advertising, and selling the seed.

Grass seeds are usually less pure than grain crops after harvest. Some species may lose half their harvested weight during the cleaning process. Cleaning fees vary by region and species but are typically charged based on the raw (uncleaned) seed weight. Some species may need to be debearded and/or stratified, but most buyers will factor these costs into the purchase price. NWSG seed producers are mostly paid on a pure live seed (PLS) basis after germination tests have been done. PLS is a product of seed purity, germination rate and dormancy rate.

Value of NWSG seed

The value of NWSG seed production varies by species. Some species produce more seed than others and thus can generate higher revenue per acre. Seed production partial budgets for big bluestem, indiangrass, and eastern gamagrass are included below in Tables 3, 4, and 5 respectively. Sensitivity analyses were prepared in Tables 6, 7, and 8 to showcase seed and price volatility.

Summary

NWSG seed production has few participants and many variables. Information in this guide is a general

Table 1. Brush stripper harvest costs.

Item	Unit	Quantity	Price	Total per acre
Operating costs				
Stirring labor	hours	1.0	17.92	17.92
Machinery operating cost	dollars per acre			11.05
Drying energy	kilowatt-hours	125.0	0.11	13.75
Storage facility upkeep	percent of value	5.0	500.00	25.00
Operating interest	percent APR	7.0	33.86	2.37
Total operating costs				67.72
Ownership costs				
Facilities and equipment interest				30.07
Depreciation				22.43
Total ownership costs				46.07
Total costs per acre				**113.79**

Totals may not sum due to rounding.

Table 2. Combine harvest costs.

Item	Unit	Quantity	Price	Total per acre
Operating costs				
Stirring labor	hours	1.0	17.92	17.92
Custom grass seed combining	dollars per acre			35.00
Drying energy	kilowatt hours	125.0	0.11	13.75
Storage facility upkeep	percent of value	5.0	500.00	25.00
Operating interest	percent APR	7.0	45.84	3.21
Total operating costs				94.88
Ownership costs				
Facilities and equipment interest				17.50
Depreciation				16.00
Total ownership costs				33.50
Total costs per acre				**128.38**

Totals may not sum due to rounding.

outline of common practices. Some situations may require special attention or different production and harvest methods. Costs and revenues presented were estimates shared by seed producers and published resources. They can serve as a starting point when looking at NWSG seed production. Different revenues and expenses may be experienced.

Table 3. Big bluestem seed production budget.

	Brush stripper harvest *($ per acre)*	**Combine harvest** *($ per acre)*
Seed production[1]	250.61	250.61
Seed loss[2]	50.12	25.06
Harvest and storage cost	113.79	128.38
Marketing cost (10 percent)	20.05	22.56
Return to land and management	**66.65**	**74.62**

1. Seed sales is based on 49.7 PLS pounds per acre sold at $5.04 per PLS pound.
2. Seed loss is assumed at 20 percent for brush stripper harvest and 10 percent for combine harvest.

Table 4. Indiangrass seed production budget.

	Brush stripper harvest *($ per acre)*	**Combine harvest** *($ per acre)*
Seed production[1]	357.21	357.21
Seed loss[2]	35.72	71.44
Harvest and storage cost	113.79	128.38
Marketing cost (10 percent)	32.15	28.58
Return to land and management	**175.55**	**128.81**

1. Seed sales is based on 56.7 PLS pounds per acre sold at $6.30 per PLS pound.
2. Seed loss is assumed at 10 percent for brush stripper harvest and 20 percent for combine harvest.

Table 5. Eastern gamagrass seed production budget.

	Brush stripper harvest *($ per acre)*	**Combine harvest** *($ per acre)*
Seed production[1]	454.27	454.27
Seed loss[2]	181.71	68.14
Harvest and storage cost	113.79	128.38
Marketing cost (10 percent)	27.26	38.61
Return to land and management	**131.52**	**219.14**

1. Seed sales is based on 41.6 PLS pounds per acre sold at $10.92 per PLS pound.
2. Seed loss is assumed at 40 percent for brush stripper harvest and 15 percent for combine harvest.

References

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Table 6. Sensitivity of big bluestem seed revenue.

Seed price *($ per PLS pound)*	**Seed yield** *(PLS pounds per acre)*				
	34.80	**42.30**	**49.70**	**57.20**	**64.60**
2.88	100.20	121.70	143.20	164.70	186.20
3.96	137.80	167.40	196.90	226.40	256.00
5.04	175.40	213.00	250.60	288.20	325.80
6.12	213.00	258.70	304.30	350.00	395.60
7.20	250.60	304.30	358.00	411.70	465.40

Table 7. Sensitivity of indiangrass seed revenue.

Seed price *($ per PLS pound)*	**Seed yield** *(PLS pounds per acre)*				
	39.70	**48.20**	**56.70**	**65.20**	**73.70**
3.60	142.90	173.50	204.10	234.70	265.40
4.95	196.50	238.60	280.70	322.80	364.90
6.30	250.00	303.60	357.20	410.80	464.40
7.65	303.60	368.70	433.80	498.80	563.90
9.00	357.20	433.80	510.30	586.80	663.40

Table 8. Sensitivity of eastern gamagrass seed revenue.

Seed price *($ per PLS pound)*	**Seed yield** *(PLS pounds per acre)*				
	29.10	**35.40**	**41.60**	**47.80**	**54.10**
6.24	181.70	220.60	259.60	298.50	337.50
8.58	249.80	303.40	356.90	410.50	464.40
10.92	318.00	386.10	454.30	522.40	590.60
13.26	386.10	468.90	551.60	634.40	717.10
15.60	454.30	551.60	649.00	746.30	843.60

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