

Niger Thistle Planting Date Study

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North Dakota farmers are seeking alternative crops to diversify marketing options, crop rotations, pest management strategies, and workload over the growing season.

However, market demand and marketing channels frequently need to be developed simultaneously with production of a new crop.

Niger thistle (*Guizotia abyssinica*) is an annual plant which belongs to the sunflower family. The crop is used exclusively as bird seed in the U.S.A., but is valued as an oilseed in other countries. The seed contains approximately 42% oil, composed primarily of linoleic acid (Diaz, 1993). The oil is used as an edible oil and in the manufacture of soaps, paints, and cosmetics.

Currently, the entire U.S. use of niger (70-80 million pounds annually) is imported from India, Ethiopia, Myanmar, and Nepal (T. Thompson, personal communication). Imports are subject to local production, domestic needs, and politics. Shipping distances, international trade regulations, currency exchange rates, and storage

costs also contribute to wide fluctuations in niger prices. For the most part, the fluctuation is seasonal, with the highest prices being paid in early spring of each year. During that time, many of the foreign companies fail to honor their contracts with the buyers. For this reason, the buyers have indicated a strong interest in working with domestic producers to improve the reliability of their supply.

Defining improved agronomic management practices will increase and stabilize yields and quality of niger thistle, which in turn will stimulate grower interest in the crop and develop a larger producer base to attract buyers. The effect of planting date on niger performance has not been studied in the Northern Plains. Given the instability of spring weather and the sensitivity of niger to frost at both ends of the season, timely planting is a critical aspect of management. The full-season cultivars (EarlyBird, Finch Gold, N951) which have been evaluated in recent years have reached maturity when planted in late May. However, research is needed to determine if a yield benefit exists from earlier planting and how much risk is involved. The development of an earlier-maturing cultivar (EarlyBird 50) in recent years provides the opportunity for delayed planting or escaping late-season drought or disease. The objective of this project is to evaluate the performance of a full-season and a short-season cultivar when planted at the normal time, earlier, or later.

Niger thistle cultivars N951 and EarlyBird 50 were sown in a randomized complete block design with four replicates at the NDSU Research Extension Centers in Carrington, Langdon, and Minot and the NDSU research site at Prosper (near Fargo). A uniform seeding rate of 6 lbs. / acre was sown in plots measuring 3.5-5' x 16-25'.

A series of environmental stresses (hail, frost, excessive moisture) precluded the collection of meaningful data at Minot and Langdon. Due to rainy weather, the Carrington planting dates extended to late June.

At Carrington, plant height was unaffected by planting date, but N951 was consistently much taller than EarlyBird 50 (Table 1). Excellent yields were obtained with both cultivars at the 27 May planting date, with EarlyBird 50 out-performing N951. EarlyBird 50 maintained a high yield when planting was delayed until 10 June, while yield of N951 was significantly reduced. Yield of both cultivars dropped drastically with the 24 June planting date. The data indicate that test weight fell with yield, but seed oil concentration was unaffected by planting date or cultivar.

Table 1. Effect of planting date and cultivar on niger performance, NDSU Carrington, 2004.

Planting Date	Cultivar	Plant Height (cm)	Yield (lb/acre)	Test Weight (lb/bu)	Oil (%)
27 May	N951	115	519	46.0	38.1
	EarlyBird 50	66	686	46.7	37.8
10 June	N951	120	115	---	36.2
	EarlyBird 50	68	642	46.2	37.2
24 June	N951	114	24	---	34.9
	EarlyBird 50	70	236	42.3	35.9
Mean	---	92	370	45.3	36.7
C.V. (%)	---	9.0	20	1.5	2.6
LSD (0.05)	---	8	117	1.6	NS
LSD (0.01)	---	11	168	2.9	NS

Across cultivars at Prosper, plant height, lodging, Sclerotinia incidence, and yield were not significantly affected when planting date was delayed from 10 May to 24 May, although yield tended to increase with later planting (Table 2). Across planting dates, EarlyBird 50 flowered considerably earlier

than N951, was significantly shorter, and showed a higher incidence of Sclerotinia. The yield of N951 tended to be higher than that of EarlyBird 50. Within cultivar and planting date, yield of both cultivars tended to increase with later planting, with a greater increase in N951 than in EarlyBird 50 (Table 3). Since temperatures remained above freezing after the earlier plantings had emerged, the unexpectedly lower yields with earlier planting may have been due to a coincidence of stress during the season and a sensitive stage of development of the plants. The differences in maturity of the two cultivars and differing yield trends with planting date support this theory.

**EarlyBird flowering on 16 Sept. 2004.**

Table 2. Main effects of planting date and cultivar on niger thistle, NDSU Prosper, 2004.

Planting Date	Cultivar	Beginning Bloom (DAP) ¹	Plant Height (inch)	Lodging (1-9) ²	Sclerotinia Incidence (%)	Yield (lb/acre)
Planting Date						
10 May		64	52	6.8	4.1	278
17 May		59	55	7.0	4.0	319
24 May		56	54	6.8	3.8	355
LSD (0.05)		1	NS	NS	NS	NS
Cultivar						
---	N951	65	59	7.2	2.3	374
---	EarlyBird 50	54	48	6.5	5.6	261
<i>t</i> -test		**	**	NS	**	NS
Mean	---	59	54	6.8	4.0	317
C.V. (%)	---	1.2	6	22.4	20.4	42.1

¹Days after planting²1 = erect, 9 = prostrate**Table 3. Planting date x cultivar interactions on niger thistle performance, NDSU Prosper, 2004.**

Planting Date	Cultivar	Beginning Bloom (DAP) ¹	Plant Height (inch)	Lodging (1-9) ²	Sclerotinia Incidence (%)	Yield (lb/acre)
10 May	N951	70	58	7.0	2.5	306
	EarlyBird 50	57	47	6.5	5.8	251
17 May	N951	64	61	6.8	2.0	402
	EarlyBird 50	54	49	7.3	6.0	237
24 May	N951	59	60	7.8	2.5	414
	EarlyBird 50	52	49	5.8	5.0	295
Mean	---	59	54	6.8	4.0	317
C.V. (%)	---	1.2	6.4	22.4	20.4	42.1
LSD (0.05)	---	1	NS	NS	NS	NS

¹Days after planting²1 = erect, 9 = prostrate**Comments**

The 2004 growing season in the Northern Plains was a difficult year for niger research, with environmental stresses affecting the quantity and the quality of the data collected. The planting date trial will be repeated in 2005

at the same four sites. This trial will provide information on the importance of timely planting and on possible fits for EarlyBird 50. At the request of the National Crop Insurance Service, preliminary data will be collected on growth stages of niger thistle.