

NIGER THISTLE PERFORMANCE TRIAL

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In a companion trial to the 2003 seeding rate x nitrogen fertilization experiment, available niger thistle cultivars were evaluated at diverse locations across the Northern Plains. Field experiments were conducted in a randomized complete block design with four replicates at the NDSU Research Extension Centers in Carrington, Langdon, Minot, Hettinger, and Williston, an NDSU research site at Prosper (near Fargo), the Montana State University Sydney Experiment Station, and an on-farm site near Thief River Falls, Minnesota. The four entries consisted of: 1) Earlybird, 2) NS031 (an earlier-maturing selection from Earlybird), 3) N951 (an experimental line from Seeds2000), and 4) Finch Gold from the University of Idaho. A uniform seeding rate of 6 lbs. / acre was sown at each location in plots measuring 3.5-5' x 16-25'. At selected sites, data was recorded on stand establishment, days to flowering, plant height, lodging, harvest dates, seed yield, and seed quality.

The trial was successfully completed at all sites except Minot and Sydney, where the plots were lost to grasshoppers and goldfinches, respectively. In the past, grasshoppers exhibited a preference to niger plots at Carrington, but were controlled with an application of Asana.

Earlybird, Finch Gold, and N951 varied slightly in days to flowering at individual sites, but were quite similar across locations (Table 1). The selection NS031 was significantly (16-17 days) earlier to bloom and to mature at all sites. Line N951 was the tallest entry at all sites, while NS031 was the shortest (Table 2). Since lodged plants are much more difficult to swath and taller plants are more susceptible to lodging and consequent yield loss due to shattering, particular attention will be paid to this trait in the future. In 2003, lodging was minimal at Carrington and Langdon, but N951 (the tallest cultivar) tended to lodge more (Table 3). At Prosper, all three taller entries were severely lodged. Line NS031 was the shortest and most erect cultivar at all sites.

Yields were excellent at Carrington and Langdon (Table 4). In Hettinger, extreme drought resulted in almost no yield. Although growing conditions were acceptable at Williston, yields only averaged 75 lbs. / acre. This may be due to the lack of pollinating insects in the plot area, which may have also been the case in Prosper. Within sites, variability was high, which

precluded statistically significant yield differences among cultivars. Earlybird produced the highest numeric yield at Langdon and Thief River Falls, while N951 and Finch Gold recorded outstanding yields at Carrington.

Overall grain test weight was fair in the medium- to high-yielding environments (Table 5). However, test weight is an important characteristic for some buyers and improvements are needed in this parameter. (At least one buyer requires a test weight of 54-60 lbs. / bushel so that 5 lbs. of seed will fit in a 5-lb. bag.)

Comments

The results of niger research in the Northern Plains continue to be encouraging as the database on agronomic production increases. The cultivar trial will be repeated in 2004 at a minimum of seven of the same sites. Special attention will be paid to plant height and lodging, test weight, and cultivar x environment interactions for yield. Although yields of NS031 have not been impressive, the earliness of this cultivar may be an advantage in certain environments, such as the drier, western part of the North Dakota. In addition to the cultivar evaluation, a planting date study will be conducted at four sites in North Dakota, comparing NS031 to one of the longer-season cultivars. This trial will provide information on the importance of timely planting and on possible fits for NS031. If possible, preliminary work will also begin on the importance of pollinating insects to niger production.

Table 1. Days to flowering in the niger thistle cultivar evaluation, 2003.

Cultivar	Carrington	Langdon	Thief River Falls ¹	Prosper	Hettinger	Williston	Mean ²
Earlybird	69.8	69.3	55	68.0	62.0	56.0	65.0
Finch Gold	69.0	70.3	43	68.0	62.0	56.0	65.1
N951	69.3	70.3	43	68.0	66.0	60.0	66.7
NS031	50.8	48.5	91	51.0	51.0	44.8	49.2
Mean	64.7	54.6	58	64.0	60.0	54.2	---
C.V. (%)	0.5	0.9	---	2.0	0.3	0.8	---
LSD (0.05)	0.6	0.9	6.6	2.0	3.0	0.7	---
LSD (0.01)	0.8	1.3	---	---	5.0	1.0	---

¹% bloom on 28 July²Thief River Falls data not included in the mean**Table 2. Plant height (inches) at maturity in the niger thistle cultivar evaluation, 2003.**

Cultivar	Carrington	Langdon	Thief River Falls	Prosper	Mean
Earlybird	53.9	41.8	47.3	65.0	52.0
Finch Gold	53.9	44.3	48.2	66.0	53.1
N951	59.4	45.9	54.9	69.0	57.3
NS031	38.4	27.2	27.0	48.0	35.2
Mean	54.1	39.8	44.4	62.0	---
C.V. (%)	1.8	7.1	---	3.0	---
LSD (0.05)	3.9	4.5	2.1	3.0	---
LSD (0.01)	5.5	6.5	---	---	---

Table 3. Lodging scores in the comparison of niger thistle cultivars, 2003.

Cultivar	Carrington	Langdon	Prosper
	(1-9) ¹	(0-9) ¹	(0-9) ¹
Earlybird	1.8	1.5	9.0
Finch Gold	1.5	1.8	9.0
N951	2.0	2.8	9.0
NS031	1.0	0.3	1.0
Mean	1.6	1.6	7.0
C.V. (%)	26.7	60.6	4.0
LSD (0.05)	NS	1.5	1.0
LSD (0.01)	NS	NS	

¹0/1 = erect, 9 = prostrate

Table 4. Yield (lb/acre) in the niger thistle cultivar evaluation, 2003.

Cultivar	Carrington	Langdon	Thief River Falls	Prosper	Hettinger	Williston	Mean ¹	Mean ²
Earlybird	570	555	356	204	18	70	295	494
Finch Gold	740	479	283	189	11	87	298	501
N951	812	373	243	205	14	76	287	476
NS031	414	452	233	233	0	69	233	366
Mean	634	465	279	208	14	75	278	459
C.V. (%)	32.1	18.3	---	12.0	43.6	25.8	---	---
LSD (0.05)	NS	NS	89	NS	NS	NS	---	---
LSD (0.01)	NS	NS	---	NS	NS	NS	---	---

¹All sites reporting yield data

²Carrington, Langdon, and Thief River Falls

Table 5. Grain test weight (lb/bushel) in the niger thistle cultivar evaluation, 2003.

Cultivar	Carrington	Langdon	Thief River Falls	Prosper	Mean
Earlybird	47.2	43.5	45.1	35.5	42.8
Finch Gold	47.7	43.5	46.1	30.6	42.0
N951	46.8	41.9	43.9	34.4	41.8
NS031	46.8	44.6	43.9	29.0	41.1
Mean	47.1	43.4	44.8	32.3	---
C.V. (%)	0.7	1.5	---	12.0	---
LSD (0.05)	0.6	1.0	0.7	NS	---
LSD (0.01)	NS	1.5	---	NS	---