

EFFECT OF SWATHING TIME ON NIGER THISTLE YIELD

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Niger thistle is commonly used as birdseed, but the current 70 million pound annual U.S. demand is all imported. The development of a short-season cultivar (EarlyBird) in recent years has permitted successful growing of niger in test areas in the Northern Plains. Research has narrowed recommendations for seeding rate and some herbicides are labeled in Minnesota and North Dakota. However, little else is known about agronomic management of the crop. This two-year project studied the effect of swathing time on yield. Field experiments were conducted at the North Dakota State University (NDSU) Research Extension Centers in Carrington, Langdon, and Minot, the NDSU research site in Prosper (near Fargo), and on-farm sites near St. Hilaire, Oklee, and Thief River Falls, Minnesota. The crop matured and produced yield at all sites, even with delayed planting, providing further evidence of the adaptation of EarlyBird to this region.

Materials & Methods

Field experiments were conducted in a randomized complete block design with four replicates at the NDSU Carrington, Langdon, and North Central (Minot) Research Extension Centers (2002-2003), the NDSU research site at Prosper (2002), and on-farm locations in northwest Minnesota (St. Hilaire and Oklee in 2002, Thief River Falls in 2003). Plot size was approximately 5' x 22', with 6-7" row spacing.

Cultivar 'Earlybird' was sown at the seeding rate of 6 lbs./acre. As the crop dried down, plots were swathed at approximately weekly intervals. Straight-combining after the first killing frost was also evaluated at selected sites.

Results & Discussion

The trials were successfully established at all sites and matured within the growing season, even when planted on 13 June 2002 in Prosper and 11 June 2003 in Minot. This is additional evidence of the adaptation of the EarlyBird cultivar for this region. However, the results on swathing times are inconsistent. In 2002, data from St. Hilaire, Oklee, and Carrington showed that swathing from 20 September to freeze-up and straight combining after the first killing frost did not significantly affect niger yield (Table 1). Lower yields were observed when the crop was swathed prior to this date, indicating the importance of late-season seed-fill in producing yield. This result indicates the importance of early planting and planting a variety which matures before the first killing frost. Numerically, the yield at these three sites peaked with swathing around 4 October. In Langdon, 15 September resulted in a significantly higher yield than later swathing. The explanation for this difference among sites is not obvious, but losses due to shattering and bird predation may be involved.

Table 1. Effect of swathing date on niger yield (lb / acre), 2002-03.

Carrington 2002			Langdon 2002			St. Hilaire 2002			Oklee 2002		
Date	Yield	GDD1	Date	Yield	GDD	Date	Yield	GDD	Date	Yield	GDD
Planted 20 May			Planted 20 May			Planted 17 May			Planted 14 May		
19 Sept.	306	2721	16 Sep	801	2444	13 Sep	169	2692	13 Sep	240	2709
26 Sept.	332	2774	23 Sep	552	2522	20 Sep	262	2818	20 Sep	401	2835
3 Oct.	359	2813	26 Sep*	532	2538	27 Sep	242	2864	27 Sep	363	2881
10 Oct.	305	2844	3 Oct*	379	2577	4 Oct	285	2909	4 Oct	421	2926
16 Oct*	249	2859				14 Oct*	227	2947	15 Oct*	372	2964
Mean	325	---	---	566	---	---	237	---	---	359	---
C.V. (%)	21.4	---	---	13.9	---	---	---	---	---	---	---
LSD (0.05)	NS	---	---	126	---	---	70	---	---	89	---

Prosper 2002			Carrington 2003			Langdon 2003			Thief River Falls 2003		
Date	Yield	GDD	Date	Yield	GDD	Date	Yield	GDD	Date	Yield	GDD
Planted 13 June			Planted 30 May			Planted 20 May			Planted 8 May		
27 Sep	194	2581	8 Sep	502	2272	29 Aug	466	2099	14 Aug	400	1990
4 Oct	195	2629	15 Sep	717	2389	5 Sep	542	2230	19 Aug	427	2161
15 Oct*	71	2679	22 Sep	595	2459	12 Sep	418	2392	27 Aug	430	2359
22 Oct*	69	2679	29 Sep	444	2508	19 Sep	359	2452	2 Sep	229	2464
			6 Oct*	462	2588				9 Sep	104	2641
									9 Sep*	168	2641
									16 Sep*	96	2752
Mean	128	---	---	544	---	---	446	---	---	265	---
C.V. (%)	24	---	---	29.1	---	---	15.0	---	---	---	---
LSD (0.05)	NS	---	---	NS	---	---	107	---	---	70	---

Minot 2003		
Date	Yield	GDD
Planted 13 June		
5 Sep	157	2157
12 Sep	202	2319
19 Sep	260	2387
26 Sep	310	2463
6 Oct	188	2570
13 Oct	189	2668
20 Oct	104	2743
Mean	202	---
C.V. (%)	50.0	---
LSD (0.05)	150	---

In 2003, yield peaked in Carrington on 15 September, in Langdon on 5 September, in Thief River Falls on or before 27 August, and in Minot on 26 September. Calendar date or days from planting are not the ideal criterion for determining the best time to swath. Growing degree days using the sunflower base temperature also proved to be grossly inadequate (Table 1). Obviously, other factors, such as late-season drought, are involved. For now, our experience in swathing time was best summarized by Hans Kandel: “a good guide to swath the niger is between 20% and 80% browning of the canopy. If high winds are forecasted, swathing should be done on the early side of the range. If the crop is less than 20% browning and a severe frost is forecasted, then swathing prior to the frost or the day after the frost is recommended.”

Literature Cited

Berglund, D.R., B. Hanson, and M. Zarnstorff.
1999. Swathing and harvesting canola. NDSU
Extension Service Bulletin A-1171. 8 p.

Diaz, M.T.B. 1993. Preliminary agronomic evaluation of new crops for North Dakota. M.Sc. Thesis, North Dakota State Univ., Fargo. 221 p.

Kandel, H.J., P.M. Porter, B.L. Johnson, R.A. Henson, B.K. Hanson, S. Weisberg, and D.G. LeGare. 2004. Plant population influences niger seed yield in the Northern Great Plains. *Crop Sci.* 44:190-97.

Porter, P.M., H.J. Kandel, B.L. Johnson, R.A. Henson, B.K. Hanson, and D.G. LeGare. 2002. Niger research in northwest Minnesota. American Society of Agronomy Annual Meetings, 10-14 November, Indianapolis, Indiana. Abstracts.

Robinson, R.G. 1986. Amaranth, quinoa, ragi, tef, and niger: tiny seeds of ancient history and modern interest. *Minn. Agric. Expt. Stn. Bull.* AD-SB-2949.