

The Influence Of Nitrogen Application On Carrot Seed Yield

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Central Oregon is the major hybrid carrot seed production area supplying the domestic fresh market carrot industry. Hybrid carrot seed yield is low, typically less than 500 lb/a. However, the price paid the grower is \$8 to 15/lb to the grower. Relative small changes in yield make a substantial difference to income, often making the difference between break even and a substantial profit.

Nitrogen is needed for carrot seed production and has been given credit for both increasing and decreasing seed yield. No record of replicated N rate evaluation is known for Central Oregon. Our objective was to measure carrot seed yield when 0, 50, and 90 lb N/a were spring-applied to a commercial field of Nantes type hybrid seed carrots, following the standard fall application of

Three replications of the nitrogen rates were applied to four rows (15 ft wide) 1325 ft long areas of a commercial field near Madras, Oregon in a completely randomized design. Cleaned seed yields are given in Table 1.

Table 1. Nantes type hybrid carrot seed yield influence to nitrogen fertilizer rates in a commercial field near Madras, OR in 2003.

Nitrogen rate	Seed Yield
----lb/a----	----lb/a----
0	223 b
50	331 a
90	242 b

Application of 50 lb N/a produced significantly more carrot seed than apply 0 or 90 lb N/a. For most crops, 50 lb N/a is a low spring application rate and would not be sufficient for optimum yield. Verification that a low rate of N is appropriate in this situation was found in the remainder of the commercial field. Approximately 15 acres of the field received 75 lb N/a and produced a seed yield of 328 lb/a, approximately the same yield attained when 50 lb N/a was applied. This data demonstrates the need for a relatively low rate of N and that an over application of N can be detrimental. The addition of only 15 to 40 lb N/a above the amount needed for maximum yield, reduced yield 89 lb/a, and would have cost the producer approximately \$1000/a.

To support the data in Table 1, we will use measurements of aboveground N accumulation determined by earlier studies in 2001 and 2002, and soil test measurements. Between 150 and 225 lb/a were found in the carrot seed crop at harvest in 2001 and 2002. The hybrid grown in 2003 was similar to the hybrid accumulating only 150 lb N/a. Table 2 provides a ledger approach to the crop N needs and the amount supplied by the soil.

Soil from the plots was sampled from the surface foot in early May. Data from 2001/2002 nutrient accumulation measurements was used to estimate the amount of N in the crop when the soil was sampled. The previous crop was roughstalk bluegrass. Crops following grass grown for seed in the Willamette Valley typically receive 50 to 100 lb N/a from the decomposing perennial grass roots. The “Balance Needed” by the carrot crop in Table 2 should be easily supplied by the decomposing grass roots.

Table 2. A ledger approach to carrot seed N supply in 2003.

System Component	Amount of N
	lb/a
Crop Use	175
In crop on May 1	-25
Amount needed for remainder of season	150
Amount available in soil on May 1	-50
Amount needed for remainder of season	100
From fertilizer	-50
Balance needed	50

Carrots grown for seed benefit from N fertilizer application. Following a roughstalk bluegrass crop, application of 50 to 75 lb N/a was sufficient for optimum carrot seed yield. The N rate is critical since a small, 15 to 40 lb/a, over application depresses seed yield and can cost growers \$1,000/a.

The amount of N supplied by the previous crop is difficult to estimate. A site and year specific test that predicts the amount of N needed for a spring application for carrot seed production is desirable.

References

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