

Lettuce Variety Trial Safford Agricultural Center, 1998

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Abstract

Eleven head lettuce varieties and four leaf lettuce varieties were grown in a replicated small plot trial on the Safford Agricultural Center in 1998. Desertgreen variety of head lettuce from Harris Moran produced a crop with the best head weight, size and firmness rating. Premiere variety followed closely behind. Of the leaf lettuce varieties tested, Saguario Romaine produced the best quality and quantity product. Per acre yields are calculated for each variety in the study.

Introduction

Head lettuce has been grown commercially and by homeowners in Graham County, but is susceptible to salt damage and large market swings. As more area farmers are looking for crops to provide an alternative from the cotton monoculture, it was decided to evaluate several lettuce varieties to find which ones would do best under our salty soil and arid growing conditions. This information will also be provided to homeowners for their gardening decisions. This trial is one of many vegetable crop variety studies conducted at the Safford Agricultural Center in 1998.

Materials and Methods

This variety trial was performed on the Safford Agricultural Center at an elevation of 2954 feet above sea level. Lettuce seeds of the fifteen varieties were planted in replicated small plot trials. Soil sulfur was worked into the beds and the plots were pre-irrigated to start the remediation process. Cultural practices and inputs are listed below in the crop history.

Crop History:

Soil type: Pima clay loam variant

Previous crop: Vegetables

Experimental design: Randomized complete block with 4 replications

Planting date: 21 August 1998 Two lines per bed, 10 inch spacings between plants (pl.pop. 32K)

Fertilizer: 400 pounds/ac soil sulfur and 244 pounds/ac 16-20-0 applied 3/13, 100 pounds/ac urea applied 5/28

Irrigation: Watered up, furrow irrigated 7 times (ca. 24 inches of water)

Herbicide: None

Insecticide: None

Harvests: Leaf lettuce - 20 November, Head lettuce - 7 December

Harvests were done manually and heads was weighed and evaluated at harvest.

Analyses from saturated paste extracts from the experimental field and a typical water sampling from the irrigation well are included below:

Sample	pH	Electroconductivity	Total Dissolved Solids	ppm Na	Estimated SAR
Soil 0-2 inches	7.81	6.42	4109	1020	9.9
Soil 6-8 inches	8.34	1.86	1190	322	6.0
Well water	7.53	2.06	1318	366	7.35

Results and Discussions

Lettuce is moderately salt sensitive (1) with a salinity threshold value for electroconductivity of 1.7 and a slope of 13. Using the formula $Y_r = 100 - B(K_e - A)$, where Y_r is the relative yield, A is the salinity threshold, B is the slope or percent yield decrease per unit salinity increase above the threshold and K_e is the electroconductivity of the saturated soil paste, the yield potential for lettuce under field conditions can be calculated. With these values it is determined that $Y_r(0 - 2") = 38.6\%$ and $Y_r(6-8") = 97.9\%$. This shows the importance of scraping off the tops of the beds to plant in less salty soil and irrigating every other row to push the salts away from the plant roots.

The top part of Table 1 gives information on the 11 head lettuce varieties. Desertgreen variety from Harris Moran produced the largest, heaviest head and it also had the best firmness rating. Premiere produced the next largest yield and it, too, had head qualities better than the rest of the field of varieties. The yield of 384 hundredweights per acre for Desertgreen was calculated from the head weight multiplied by 32,000 plants per acre. (The lettuce was planted on two lines on a 36 inch bed, with an average spacing of 10 inches between plants in a line.) In spite of the fact that salt in the soil could suppress yields, the top two varieties produced yields comparable with most places in the country. Lorenz and Maynard (2) report that the average lettuce yield in the United States is 280 hundredweights per acre and 400 hundredweights per acre is considered a good yield.

The bottom part of the table provides information on the leaf lettuce varieties studied. Saguaro Romaine produced a yield superior to the other varieties tested. Two of the varieties had bolting problems and in the case of Deep Red the problems were severe. Yields for the leaf lettuce were calculated in the same manner as the head lettuce.

Lettuce can be commercially grown in the area, but caution must be taken to plant in fields where the salt problems are low or where they can be controlled by remediation. The nearest infrastructure base for lettuce is Willcox, approximately 50 miles away. The biggest challenge in producing lettuce is marketing.

References

1. Maas, E.V. 1986. Salt tolerance of plants. Applied Agricultural Research Vol. 1, No. 1, pp. 12-16. Springer-Verlag New York.
2. Lorenz, O.A. and D.N. Maynard. 1988. Knott's Handbook for vegetable growers, third edition. Wiley-Interscience Publication, New York.

Table 1. Lettuce harvest quality and yields by varieties grown at the Safford Agricultural Center, 1998.

Variety	Head weight (lbs)	Head size (diameter inches)	Yield (Cwt/acre)	Head firmness ¹	Bolting ²
Head Lettuce					
Desertgreen	1.20 a ³	4.6 a	384	4.6 a	--
Premiere	1.00 ab	4.4 a	320	4.5 a	--
Valley Green	0.95 ab	4.1 a	304	4.2 a	--
Valley Queen	0.94 ab	4.1 a	301	4.1 a	--
Alpha DMR	0.93 ab	4.2 a	298	3.5 a	--
Van Fall	0.90 b	4.2 a	288	4.0 a	--
Coolgreen	0.89 b	4.3 a	285	3.5 a	--
Sun Devil	0.89 b	4.0 a	285	4.1 a	--
Maxium	0.88 b	4.1 a	282	4.5 a	--
Fall Green	0.74 b	3.8 a	237	3.7 a	--
Gilaben	0.73 b	3.8 a	234	4.1 a	--
Average	0.91	4.1	292.5	4.1	--
LSD(05)	0.28	0.8	--	1.1	--
CV(%)	21.2	13.2	--	18.8	--
Leaf Lettuce					
Saguaro Romaine	1.03 a	8.7 a	330	--	--
Deep Red	0.67 b	7.9 ab	214	--	4.0
Tania Butterhead	0.59 b	6.3 b	189	--	--
Ruby Ruffle	0.48 b	7.6 ab	154	--	1.3
Average	0.069	7.6	221.8	--	--
LSD(05)	0.26	1.8	--	--	--
CV(%)	24.0	15.0	--	--	--

1. Firmness rating: 1 = soft, 5 = hard.

2. Bolting rating: 1 = No bolting, 5 = 100% bolting.

3. Values within a column followed by the same letter are not significantly different at the 95% level of confidence using Duncan's Multiple Range test.