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EFFECTS OF NITROGEN RA
SUNFLOWER SEED YIELDS /

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Experimen

Sunflower (Helianthus annus L.) 1
eastern United States. It was grow
in 1968 with seed yields from 1,100

Much of the literature on sunf
this crop for silage in the northern
and Eisenmenger (3) found that the e
rows. In Minnesota, seed yields, a
as plant spacing decreased (4).

Information is not available o
seed crop in the Southeast. Since
lation are important factors in det r
to determine the effects of nitroge
and other plant characteristics of

Materials

This investigation was conducted
on Cecil sandy loam of pH 6.5. Nit
the rates of 0, 56, 112, and 168 k
where required, at planting time a
were applied at the rates of 49 and
were 15, 30, and 46 cm in 1.1-m ro
plants per hectare, respectively).
latin square replicated four times
spacing as subplots.

Seed of 'Mammoth Russian' sun
was planted in 1968 and 1969. Plo
the desired stand. Plots were not i

Heads were harvested from 4.6
for seed yields. Average plant he
of leaves per plant were determine
subplot. Yield per head was calcu
number of heads harvested. Seed si
selected seed from each subplot.

1 Hagen, Dick. 1968. Sunflowers new thr
31, 36.

7. The average achene yield in pounds per acre of VNIIMK 89.31 sunflowers for 1968 and 1969 for the various populations and widths between rows.

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Results and Discussion

Nitrogen applied to sunflower plots at the rate of 56 kg/ha increased seed yield, grams of seed per head, seed size, plant height, and the diameters of heads and stems (Table 1). Higher N rates gave no additional responses.

Table 1

Effects of N Rates on Sunflower Seed Yield and Other Characteristics, 1967-1969.

N rate	Seed			Plant	Diameter	
	Yield	Yield/head	Size	height	Head*	Stem
kg/ha	kg/ha	g	g/200	cm	cm	mm
0	1,569 a+	48.7 a	13.1 a	191 a	15.7 a	22 a
56	2,263 b	68.9 b	15.2 b	206 b	17.9 b	26 b
112	2,443 b	73.6 b	15.8 b	206 b	18.6 b	27 b
168	2,458 b	75.8 b	16.0 b	203 b	18.6 b	26 b

*2-yr average (1968-1969). +Means followed by the same letter are not significantly different at the 5% level, according to Duncan's Multiple Range Test.

Compared to yields from non-treated check plots, 56 kg of N/ha increased seed yields 694 kg/ha. Although there was a trend for higher yields from N rates above 56 kg/ha, none of these increases were significant. These results indicate that for maximum sunflower seed yields in the Georgia Piedmont the N rate required lies between 56 and 112 kg/ha. Sunflower seed size increased 2.1 g/200 seed from N at 56 kg/ha as compared with seed from plots that received no N. Seed yields per head in plots receiving 56, 112, and 168 kg/ha of N were not significantly different and averaged 72.8 g, or 24.1 g more than the yield from no N plots. Plots receiving 56 kg/ha of N had plants with greater head diameter than plots not receiving N. N influenced plant growth, as plants from N plots were taller, regardless of rates, when compared with growth of plants from untreated plots. Plant stems from plots receiving 56 kg/ha were 4 mm larger in diameter than those of plants from untreated plots. Nitrogen levels had no effect on number of leaves, which average 35 per plant.

Plant spacing significantly affected seed yield, grams of seed per head, seed size, and head and stem diameters (Table 2).

Table 2

Effects of Plant Spacing on Sunflower Seed Yield and Other Characteristics, 1967-1969.

Plant Spacing	Seed			Diameter	
	Yield	Yield/head	Size	Head*	Stem
cm	ha/kg	g	g/200	cm	mm
15	2,641 b+	42.8 a	13.4 a	16.3 a	22 a
30	2,046 a	66.5 b	15.2 b	17.6 b	25 b
46	1,862 a	90.9 c	16.6 c	19.4 c	28 c

*2-yr average (1968-1969). +Means followed by the same letter are not significantly different at the 5% level, according to Duncan's Multiple Range Test.

Seed yields at 15-cm plant spacing were significantly higher than yields at 30- and 46-cm spacings, which were not different. Seed yield per head at 46 cm was twice that for 15 cm, while the yield for 30 cm was imtermediate. Seed size and head diameter were largest at the 46-cm spacing and decreased in size as plant spacing was reduced from 46 cm to 15 cm. Each successive 15-cm increase in plant spacing resulted in a 3-mm increase in stem diameter. Since plants with small stems tend to lodge, Kucinsky and Eisenmenger (3) did not recommend high plant populations. However, lodging was not severe at any of the different N rates or plant spacings of this study. Plant spacing did not affect plant height or the number of leaves per plant.

There were no interactions for any characteristics studied when different levels of N were applied to sunflower plots with varying plant spacings.

Summary

1. The effects of four nitrogen rates and three plant spacings on sunflower seed yield and other characteristics were studied at Experiment, Georgia.

2. Nitrogen at 56 kg/ha increased seed yield, grams of seed per head, seed size, head diameter, plant height, and stem diameter, as compared to non-treated plots.

3. Additional nitrogen increments produced no further increases.

4. Nitrogen did not affect number of leaves per plant.

5. Seed yield was higher for 15- than for 30- and 46-cm spaci·,.

6. Each 15-cm increase in plant spacing increased yield per head, seed size, head diameter, and stem size.

7. Spacing did not affect plant height or number of leaves per plant.

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