Influence of Row Spacing and Planting Rate on Weed Control, Ascochyta Blight Incidence, and Economics of Chickpea Production

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Objectives

1. **Determine the influence of** chickpea row spacing and seeding rate on weed control; determine the level of weed control obtained from herbicides only, cultivation only, and a combination of herbicides and cultivation in large and small kabuli chickpea.
2. Determine the influence of chickpea row spacing and seeding rate on ascochyta incidence and severity in large and small kabuli chickpea.
3. Determine the influence of row spacing and seeding rate on the economics of chickpea production.

Results

At Minot, weed control and disease studies were conducted separately in large and small kabuli chickpea. The disease study in particular had significant varietal interactions; therefore, all data is presented by variety. At Carrington, the weed control and disease studies were randomized together into one study, but the data is presented by variety. Sierra (large kabuli) and B-90 (small kabuli) chickpeas were used at Minot and Carrington.

Minot weed control summary:

Actual crop density and weed control method were generally the most important factors in reaching higher chickpea yields. In this study, we considered the "standard" treatment to be narrow rows (7.5"), a seeding rate of 140,000 seeds/A, and a herbicide application, which consisted of Spartan + Sonalan preplant incorporated. This standard treatment was compared to wide rows (30") to allow for cultivation, seeding rates of 70,000 and 35,000 seeds/A, and weed control methods consisting of herbicide, cultivation, or herbicide + cultivation.

Generally, higher yields were achieved with higher plant densities and the use of a herbicide or herbicide + cultivation. However, lower seeding rates and/or wide rows did produce similar yields in some cases. For example, four treatments in both the large and small kabuli studies produced similar yields to the standard treatment (Table 1 and 2). Even treatments with wide rows and the lowest plant density produced yields similar to the standard treatment. In this case, both large and small kabuli chickpea grown in 30" rows with a seeding rate of 35,000 seeds/A with herbicide + cultivation yielded numerically less than the standard, but the yields were not significantly different (Table 1 and 2).

Treatment 6 in both the large and small kabuli studies showed the weakness of wide rows and low seeding rate combined with only a preplant herbicide to control weeds (Table 1 and 2). Treatment 8 had the same row spacing and seeding rate as Treatment 6, but had herbicide + cultivation to control weeds. Herbicide + cultivation provided better pigweed control and resulted in a 300-400 lb yield increase.

Cultivation alone did not provide sufficient weed control and resulted in very poor yields. However, the timing of cultivation was delayed several days by rain, which allowed pigweed to grow and become competitive with the crop and difficult to remove by cultivation. A more timely cultivation would likely have been more effective at controlling weeds and producing higher yields.

In the small kabuli study, there was a trend for higher chickpea test weight with the wider rows and lower plant populations (Table 2). However, this difference was not evident in the large kabuli study (Table 1).

Minot disease control summary:

Large kabuli

Treatments receiving a fungicide application or treatments with higher initial plant densities had higher large kabuli yields (Table 7). Treatments receiving no fungicide application yielded 400-1000 lbs lower than the same treatments with a fungicide application. Regardless of whether a fungicide was applied or not, yields decreased as initial plant densities decreased. All treatments except one (TRT 2), yielded significantly lower than the standard treatment (7.5" row spacing, 140,000 seeds/A seeding rate, and fungicide application).

Ascochyta blight ratings were significantly higher in the absence of a fungicide application (Table 7). Reducing plant density generally did not reduce ascochyta blight incidence. Ascochyta ratings were generally similar regardless of row spacing and seeding rate. The presence/absence of a fungicide application was more important in determining the level of ascochyta blight incidence.

Small kabuli

In contrast to the large kabuli results, higher yields were not necessarily a function of higher initial plant densities and a fungicide application. In fact, treatments not receiving a fungicide application generally did not differ in yield or ascochyta rating from treatments that did receive a fungicide application (Table 11). There was a trend for higher yields from a fungicide application, but the differences were not significant. Higher initial plant densities did not lead to higher yields than those with lower initial plant densities.

Carrington summary:

At Carrington, the three weed control methods, fungicide treatments, and the two varieties were randomized together into one study, but the data is presented below by variety. Treatments 1, 2, 3, and 6 received a fungicide application and can be compared to treatments 9, 10, 11, and 12, respectively, which did not receive a fungicide application.

Large kabuli

Treatments receiving a fungicide application tended to yield higher than treatments receiving no fungicide, but were not significantly different (Table 15). Treatments with higher initial densities also tended to have higher yields. Test weight and kernel weight did not differ among treatments where direct comparisons could be made (Table 15).

Herbicide or herbicide + cultivation produced similar yields at either seeding rate (compare TRT 3 & 5 and TRT 6 & 8 in Table 15). Cultivation alone did not provide sufficient weed control (TRT 4 or 7); however, rainfall prevented timely cultivation and allowed weeds to exceed the optimum size for cultivation.

Ascochyta ratings did not differ for any treatment at the July 21 evaluation (Table 16). At the October 2 evaluation, ascochyta ratings tended to be higher in treatments with no fungicide application. Wide row and low seeding rates tended to have lower ascochyta ratings, but also had lower yields.

Small kabuli

Treatments receiving no fungicide tended to yield similar to or higher than treatments receiving a fungicide application, but were not significantly different (Table 18). Treatments with higher initial densities also tended to have higher yields. Test weight and kernel weight generally did not differ among treatments where direct comparisons could be made (Table 18).

Herbicide or herbicide + cultivation produced similar yields at either seeding rate (compare TRT 3 & 5 and TRT 6 & 8 in Table 18). Cultivation alone did not provide sufficient weed control (TRT 4 or 7). Rainfall prevented timely cultivation and allowed weeds to surpass the optimum size for cultivation.

Ascochyta ratings did not differ for any treatment at the July 21 evaluation (Table 19). At the October 2 evaluation, ascochyta ratings were similar among treatments with or without a fungicide application (i.e., TRT 1 vs. 9, TRT 2 vs. 10, etc.). Wide row and low seeding rates tended to have lower ascochyta ratings, but also had lower yields.

Overall conclusion:

Chickpea yields achieved from narrow rows and lower seeding rates were more successful at Minot than at Carrington when compared to the "standard treatment". Several treatments at Minot had yields that were similar to the standard treatment yield in both the large and small kabuli varieties. At Carrington, none of the 30" row-spacing treatments approached the yield obtained from the standard treatment.

At Minot, when comparing weed control and yields in 30" rows, weed control and yields generally increased when cultivation followed the preplant herbicide application. Yields from wide rows were comparable to the standard treatment in some cases. Poor yields in some treatments can be partially attributed to low actual plant densities. At Minot and Carrington, actual plant densities were sometimes 20-50% lower than the desired seeding rate.

At Minot and Carrington, herbicide and herbicide + cultivation was more effective than cultivation alone. At Minot, herbicide + cultivation tended to increase yields compared to herbicide alone. At Carrington, yields were similar for herbicide alone or herbicide + cultivation. Ascochyta ratings generally were not affected by row spacing at Minot or Carrington, though there was a slight trend at Carrington for less disease with wider rows. As expected, the large kabuli variety responded more to fungicide application than the small kabuli variety, which has more natural tolerance to the disease.

An economic analysis will be conducted after the second year of the study in 2004.

Table 1. Effect of row spacing, seeding rate, and weed control method on large kabuli production and redroot pigweed (Rrpw) control in Minot (2003).

TRT	Row spacing Seeding rate Weed control	TRT abbrev.	Crop density pl ft^{-2}	Yield lb/A	Test wt. lb/bu	Rrpw control %
1	7.5" row 140,000 seeds/A Herbicide	R1 S1 W1	2.25 a[1]	1140 a	59.0 a	97 a
2	7.5" row 70,000 seeds/A Herbicide	R1 S2 W1	1.26 b	1010 a	59.2 a	92 a
3	30" row 70,000 seeds/A Herbicide	R2 S2 W1	0.65 c	920 ab	60.1 a	83 ab
4	30" row 70,000 seeds/A Cultivation	R2 S2 W2	0.70 c	60 c	58.7 a	16 c
5	30" row 70,000 seeds/A Herb + Cult	R2 S2 W3	0.67 c	1220 a	58.3 a	95 a
6	30" row 35,000 seeds/A Herbicide	R2 S3 W1	0.47 d	590 b	58.7 a	76 b
7	30" row 35,000 seeds/A Cultivation	R2 S3 W2	0.44 d	0 c	—	14 c
8	30" row 35,000 seeds/A Herb + cult	R2 S3 W3	0.44 d	990 a	59.3 a	92 a

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 2. Effect of row spacing, seeding rate, and weed control method on small kabuli production and redroot pigweed (Rrpw) control in Minot (2003).

TRT	Row spacing Seeding rate Weed control	TRT abbrev.	Crop density pl ft^{-2}	Yield lb/A	Test wt. lb/bu	Rrpw control %
1	7.5" row 140,000 seeds/A Herbicide	R1 S1 W1	2.66 a[1]	2120 ab	57.4 c	91 abc
2	7.5" row 70,000 seeds/A Herbicide	R1 S2 W1	1.57 b	2440 a	58.6 bc	89 cd
3	30" row 70,000 seeds/A Herbicide	R2 S2 W1	0.84 c	1850 ab	60.3 ab	91 bc
4	30" row 70,000 seeds/A Cultivation	R2 S2 W2	0.79 c	460 c	60.5 ab	16 e
5	30" row 70,000 seeds/A Herb + Cult	R2 S2 W3	0.79 c	1860 ab	59.7 abc	96 ab
6	30" row 35,000 seeds/A Herbicide	R2 S3 W1	0.75 c	1610 b	61.2 a	84 d
7	30" row 35,000 seeds/A Cultivation	R2 S3 W2	0.68 c	350 c	60.8 ab	16 e
8	30" row 35,000 seeds/A Herb + cult	R2 S3 W3	0.78 c	1910 ab	60.5 ab	97 a

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 3. P values for row spacing-seeding rate, weed control, and interactions in large kabuli at Minot, ND (2003).

	Crop density	Yield	Test wt	Rrpw
RS-SR	0.0001	0.0070	0.8868	0.0066
WC	0.9763	0.0001	0.5126	0.0001
RS-SR*WC	0.6843	0.4402	0.0469	0.8077

Table 4. Impact of weed control method on redroot pigweed control in large kabuli chickpea at Minot, ND (2003).

	N	Redroot pigweed % control
Herb + Cult	8	94 a[1]
Herbicide	16	87 a
Cultivation	8	15 b

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 5. P values for row spacing-seeding rate, weed control, and interactions in small kabuli at Minot, ND (2003).

	Crop density	Yield	Test wt	Rrpw
RS-SR	0.0001	0.0700	0.0026	0.1967
WC	0.8465	0.0001	0.5920	0.0001
RS-SR*WC	0.8890	0.7879	0.8876	0.0656

Table 6. Impact of weed control method on redroot pigweed control in small kabuli chickpea at Minot (2003).

	N	Redroot pigweed % control
Herb + Cult	8	96 a[1]
Herbicide	16	89 b
Cultivation	8	16 c

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 7. Effect of row spacing, seeding rate, and fungicide on large kabuli production and ascochyta control in Minot (2003).

TRT	Row spacing Seeding rate Fungicide	TRT abbrev.	Crop density pl ft^{-2}	Yield lb/A	Test wt. lb/bu	Ascoch Jul 22	Ascoch Aug 11
1	7.5" row 140,000 seeds/A Fungicide	R1 S1 F1	1.95 a[1]	1760 a	58.3 bc	1.13 b	1.50 e
2	7.5" row 70,000 seeds/A Fungicide	R1 S2 F1	1.18 b	1490 a	58.0 c	1.25 b	1.88 de
3	30" row 70,000 seeds/A Fungicide	R2 S2 F1	0.63 c	1060 b	57.8 c	1.13 b	1.88 de
4	30" row 35,000 seeds/A Fungicide	R2 S3 F1	0.38 c	830 bc	59.1 ab	1.38 b	2.25 cde
5	7.5" row 140,000 seeds/A No Fungicide	R1 S1 F2	2.13 a	780 bc	59.4 a	2.13 a	3.89 a
6	7.5" row 70,000 seeds/A No Fungicide	R1 S2 F2	0.98 b	670 bc	59.1 ab	2.25 a	3.75 ab
7	30" row 70,000 seeds/A No Fungicide	R2 S2 F2	0.50 c	560 c	59.1 ab	2.13 a	2.75 bcd
8	30" row 35,000 seeds/A No Fungicide	R2 S3 F2	0.38 c	460 c	58.4 abc	1.88 a	3.00 abc

[1] Means followed by the same letter within a column do not differ significantly ($P<0.05$) by LSD.

Table 8. P values for row spacing-seeding rate, fungicide, and interactions in large kabuli at Minot, ND (2003).

	Crop density	Yield	Test wt	Asc722	Asc811
RS-SR	0.0001	0.0003	0.5129	0.6117	0.4537
Fungicide	0.5450	0.0001	0.0027	0.0001	0.0001
RS-SR*Fungicide	0.1739	0.0857	0.0110	0.0870	0.0462

Table 9. Impact of fungicide on yield of large kabuli chickpea at Minot, ND (2003). Data averaged across row spacings and seeding rates.

	N	Yield lb/A
Fungicide	15	1320 a[1]
No Fungicide	16	610 b

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 10. Impact of fungicide on ascochyta in large kabuli chickpea at Minot, ND (2003). Data averaged across row spacings and seeding rates.

	N	Ascochyta rating Jul 22	Ascochyta rating Aug 22
Fungicide	16	1.22 b[1]	1.88 b
No Fungicide	16	2.09 a	3.34 a

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 11. Effect of row spacing, seeding rate, and fungicide on small kabuli production and ascochyta control in Minot (2003).

TRT	Row spacing Seeding rate Fungicide	TRT abbrev.	Crop density pl ft^{-2}	Yield lb/A	Test wt. lb/bu	Ascoch Jul 22	Ascoch Aug 11
1	7.5" row 140,000 seeds/A Fungicide	R1 S1 F1	2.88 a[1]	1650 a	59.2 a	1.0 a	1.00 b
2	7.5" row 70,000 seeds/A Fungicide	R1 S2 F1	1.70 c	1670 a	60.3 a	1.0 a	1.00 b
3	30" row 70,000 seeds/A Fungicide	R2 S2 F1	0.70 d	1570 a	60.0 a	1.0 a	1.00 b
4	30" row 35,000 seeds/A Fungicide	R2 S3 F1	0.68 d	1520 a	60.1 a	1.0 a	1.00 b
5	7.5" row 140,000 seeds/A No Fungicide	R1 S1 F2	2.50 b	1350 a	59.8 a	1.0 a	1.38 a
6	7.5" row 70,000 seeds/A No Fungicide	R1 S2 F2	1.58 c	1290 a	58.6 a	1.0 a	1.13 b
7	30" row 70,000 seeds/A No Fungicide	R2 S2 F2	0.73 d	1540 a	60.4 a	1.0 a	1.13 b
8	30" row 35,000 seeds/A No Fungicide	R2 S3 F2	0.73 d	1390 a	61.1 a	1.0 a	1.00 b

[1] Means followed by the same letter within a column do not differ significantly ($P<0.05$) by LSD.

Table 12. P values for row spacing-seeding rate, fungicide, and interactions in small kabuli at Minot, ND (2003).

	Crop density	Yield	Test wt	Asc722	Asc811
RS-SR	0.0001	0.9626	0.1358	1.0	0.0607
Fungicide	0.0377	0.1403	0.8388	1.0	0.0028
RS-SR*Fungicide	0.0179	0.7974	0.0969	1.0	0.0607

Table 13. Impact of fungicide on yield of small kabuli chickpea at Minot, ND (2003). Data averaged across row spacings and seeding rates.

	N	Yield lb/A
Fungicide	14	1610 a
No Fungicide	13	1390 a

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 14. Impact of fungicide on ascochyta in small kabuli chickpea at Minot, ND (2003). Data averaged across row spacings and seeding rates.

	N	Ascochyta rating Jul 22	Ascochyta rating Aug 22
Fungicide	16	1.0 a[1]	1.0 a
No Fungicide	16	1.0 a	1.16 a

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 15. Effect of row spacing, seeding rate, weed control method, and fungicide on large kabuli production at Carrington, ND (2003).

TRT	Row spacing Seeding rate Weed control Fungicide	TRT abbrev.	Crop density pl ft^{-2}	Yield lb/A	Test wt. lb/bu	KWT g/250seeds
1	7.5" row 140,000 seeds/A Herbicide Fungicide	R1 S1 W1 F1	2.42 a[1]	1720 a[1]	56.5 a	128 ab
2	7.5" row 70,000 seeds/A Herbicide Fungicide	R1 S2 W1 F1	1.62 bc	1500 a	55.7 a	131 a
3	30" row 70,000 seeds/A Herbicide Fungicide	R2 S2 W1 F1	1.18 cd	1070 bc	57.2 a	110 bcd
4	30" row 70,000 seeds/A Cultivation Fungicide	R2 S2 W2 F1	1.18 cd	580 de	56.8 a	114 abcd
5	30" row 70,000 seeds/A Herb + Cult Fungicide	R2 S2 W3 F1	1.18 cd	1080 bc	57.1 a	126 abc
6	30" row 35,000 seeds/A Herbicide Fungicide	R2 S3 W1 F1	0.70 ef	880 cd	57.1 a	104 d
7	30" row 35,000 seeds/A Cultivation Fungicide	R2 S3 W2 F1	0.62 f	240 e	56.6 a	119 abcd
8	30" row 35,000 seeds/A Herb + cult Fungicide	R2 S3 W3 F1	0.59 f	760 cd	57.2 a	107 cd
9	7.5" row 140,000 seeds/A Herbicide No Fungicide	R1 S1 W1 F2	1.85 b	1430 ab	57.4 a	128 ab
10	7.5" row 70,000 seeds/A Herbicide No Fungicide	R1 S2 W1 F2	1.66 b	1470 ab	56.2 a	125 abc

11	30" row 70,000 seeds/A Herbicide No Fungicide	R2 S2 W1 F2	1.09 de	740 cd	56.6 a	105 d
12	30" row 35,000 seeds/A Herbicide No Fungicide	R2 S3 W1 F2	0.56 f	640 de	57.2 a	114 abcd

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 16. Effect of row spacing, seeding rate, weed control method, and fungicide on large kabuli production and ascochyta control at Carrington, ND (2003).

TRT	Row spacing Seeding rate Weed control Fungicide	TRT abbrev.	Ascochyta rating Jul 21	Ascochyta rating Oct 2
1	7.5" row 140,000 seeds/A Herbicide Fungicide	R1 S1 W1 F1	1.75 a[1]	3.75 cd
2	7.5" row 70,000 seeds/A Herbicide Fungicide	R1 S2 W1 F1	1.75 a	4.0 bc
3	30" row 70,000 seeds/A Herbicide Fungicide	R2 S2 W1 F1	1.75 a	3.5 cde
4	30" row 70,000 seeds/A Cultivation Fungicide	R2 S2 W2 F1	1.5 a	2.25 f
5	30" row 70,000 seeds/A Herb + Cult Fungicide	R2 S2 W3 F1	2.0 a	3.25 cde
6	30" row 35,000 seeds/A Herbicide Fungicide	R2 S3 W1 F1	2.0 a	2.75 ef
7	30" row 35,000 seeds/A Cultivation Fungicide	R2 S3 W2 F1	2.0 a	2.25 f
8	30" row 35,000 seeds/A Herb + cult	R2 S3 W3 F1	2.0 a	2.25 f

	Fungicide			
9	7.5" row 140,000 seeds/A Herbicide No Fungicide	R1 S1 W1 F2	1.88 a	4.75 ab
10	7.5" row 70,000 seeds/A Herbicide No Fungicide	R1 S2 W1 F2	2.0 a	5.25 a
11	30" row 70,000 seeds/A Herbicide No Fungicide	R2 S2 W1 F2	1.75 a	3.0 def
12	30" row 35,000 seeds/A Herbicide No Fungicide	R2 S3 W1 F2	2.0 a	3.0 def

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 17. Impact of fungicide on ascochyta in large kabuli chickpea at Carrington, ND (2003). Data averaged across row spacings, seeding rates, and weed control methods.

	N	Ascochyta rating Jul 21	Ascochyta rating Oct 2
Fungicide	32	1.8 a[1]	3.0 b
No Fungicide	16	1.9 a	4.0 a

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 18. Effect of row spacing, seeding rate, weed control method, and fungicide on small kabuli production at Carrington, ND (2003).

TRT	Row spacing Seeding rate Weed control Fungicide	TRT abbrev.	Crop density pl ft^{-2}	Yield lb/A	Test wt. lb/bu	KWT g/250seeds
1	7.5" row 140,000 seeds/A Herbicide Fungicide	R1 S1 W1 F1	1.97 a[1]	1970 ab	58.8 a	81 a
2	7.5" row 70,000 seeds/A Herbicide Fungicide	R1 S2 W1 F1	1.38 b	1920 ab	59.0 a	79 ab
3	30" row 70,000 seeds/A Herbicide Fungicide	R2 S2 W1 F1	0.94 c	1230 cde	56.6 a	80 a
4	30" row 70,000 seeds/A Cultivation Fungicide	R2 S2 W2 F1	0.99 c	460 fg	57.3 a	79 ab
5	30" row 70,000 seeds/A Herb + Cult Fungicide	R2 S2 W3 F1	0.89 c	1170 de	57.9 a	77 ab
6	30" row 35,000 seeds/A Herbicide Fungicide	R2 S3 W1 F1	0.47 d	930 ef	57.6 a	76 abc
7	30" row 35,000 seeds/A Cultivation Fungicide	R2 S3 W2 F1	0.35 d	300 g	56.5 a	72 c
8	30" row 35,000 seeds/A Herb + cult Fungicide	R2 S3 W3 F1	0.45 d	1140 de	57.1 a	76 abc
9	7.5" row 140,000 seeds/A Herbicide No Fungicide	R1 S1 W1 F2	1.92 a	2100 a	58.8 a	81 a

10	7.5" row 70,000 seeds/A Herbicide No Fungicide	R1 S2 W1 F2	1.46 b	1740 abc	57.7 a	81 a
11	30" row 70,000 seeds/A Herbicide No Fungicide	R2 S2 W1 F2	0.88 c	1510 bcd	57.3 a	74 bc
12	30" row 35,000 seeds/A Herbicide No Fungicide	R2 S3 W1 F2	0.41 d	1030 de	56.4 a	76 abc

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 19. Effect of row spacing, seeding rate, weed control method, and fungicide on small kabuli production and ascochyta control at Carrington, ND (2003).

TRT	Row spacing Seeding rate Weed control Fungicide	TRT abbrev.	Ascochyta rating Jul 21	Ascochyta rating Oct 2
1	7.5" row 140,000 seeds/A Herbicide Fungicide	R1 S1 W1 F1	1.0 a[1]	4.0 a
2	7.5" row 70,000 seeds/A Herbicide Fungicide	R1 S2 W1 F1	1.0 a	3.13 ab
3	30" row 70,000 seeds/A Herbicide Fungicide	R2 S2 W1 F1	1.0 a	2.5 bc
4	30" row 70,000 seeds/A Cultivation Fungicide	R2 S2 W2 F1	1.25 a	2.0 c
5	30" row 70,000 seeds/A Herb + Cult Fungicide	R2 S2 W3 F1	1.0 a	2.75 bc
6	30" row 35,000 seeds/A	R2 S3 W1 F1	1.25 a	2.5 bc

	Herbicide Fungicide			
7	30" row 35,000 seeds/A Cultivation Fungicide	R2 S3 W2 F1	1.50 a	2.0 c
8	30" row 35,000 seeds/A Herb + cult Fungicide	R2 S3 W3 F1	1.50 a	2.75 bc
9	7.5" row 140,000 seeds/A Herbicide No Fungicide	R1 S1 W1 F2	1.0 a	3.5 ab
10	7.5" row 70,000 seeds/A Herbicide No Fungicide	R1 S2 W1 F2	1.0 a	3.0 abc
11	30" row 70,000 seeds/A Herbicide No Fungicide	R2 S2 W1 F2	1.25 a	2.75 bc
12	30" row 35,000 seeds/A Herbicide No Fungicide	R2 S3 W1 F2	1.0 a	2.5 bc

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.

Table 20. Impact of fungicide on ascochyta in small kabuli chickpea in Carrington, ND (2003). Data averaged across row spacings, seeding rates, and weed control methods.

	N	Ascochyta rating Jul 21	Ascochyta rating Oct 2
Fungicide	32	1.2 a[1]	2.7 a
No Fungicide	16	1.1 a	2 9 a

[1] Means followed by the same letter within a column do not differ significantly (P<0.05) by LSD.