

Abstract

Surface drip irrigation laterals were spaced next to crop rows (0.91 m) and in alternate row middles (1.83 m) to document crop yield and partial economic returns compared with non-irrigated areas during the 2002 to 2004 growing season. A surface drip irrigation system was installed at two sites on a Faceville (Site 1) fine sandy loam (Fine, kaolinitic, thermic Typic Kandiudults) and a Greenville (Site 2) fine sandy loam (fine, kaolinitic, thermic Rhodic Kandiudults) with 1 to 3% slope, respectively. Cotton and corn were planted on 0.91 m row spacing. Corn seed cost \$52/ha for non-irrigated and \$86/ha for irrigated. Both drip tube orientations had the same corn yield (10,555 kg/ha) compared with the non-irrigated areas (5,562 kg/ha). Subtracting the cost of the corn seed and drip tubing from the two irrigated regimens show that 0.91 m lateral spacing had a negative \$-140/ha return compared with non-irrigated (\$484/ac). The 1.83 m spaced laterals had a positive \$196/ha net return compared with non-irrigated areas. Cotton lint yield averaged 1194 kg/ha for 0.91 m and 1.83 m lateral spacing compared with the non-irrigated lint yield (608 kg/ha). Cotton gross revenue at both sites averaged about \$1200/ha for both lateral orientations. Non-irrigated cotton gross revenue averaged just over \$600/ha. Subtracting the cost of tubing resulted in net revenues of \$613 and \$969 for 0.91 and 1.83 m lateral spacing, respectively. Non-irrigated corn and cotton revenues were equal to or greater than the 0.91 m lateral spacing. Lateral spacing of 0.91 m may not be cost effective for either corn or cotton. Partial net return analysis shows that 1.83 m lateral spacing had higher returns for both crops compared with non-irrigated returns.

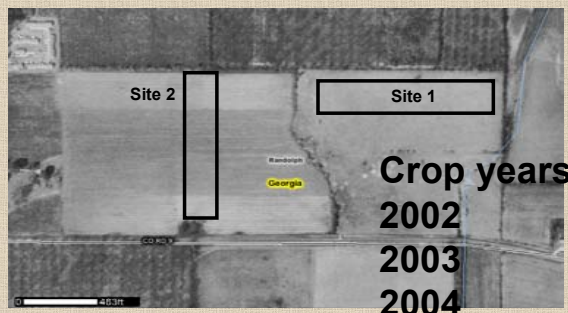


Figure 1: Site layout

Materials and Methods

- Two Sites – Two soil types – Two slopes – Two drip lateral spacing – Three years
- Clean tilled – 0.91 m rows – SD tubing spacing 0.91 and 1.83 m.
- Corn planted 25 March to 05 April; Harvested 14 to 20 August (DK687 and DK6972).
- Cotton planted 22 April to 10 May; Harvested 08 Oct to 08 Nov (DPL458 and DPL555).
- Weed/disease control following accepted BMP described by Univ. of GA.
- Tubing was installed before crop emergence (Figure 2).
- Irrigation was applied at 80% of recommended rates for corn or cotton.
- Corn harvested using conventional four-row equipment.
- Cotton harvested using conventional two-row equipment.
- ANOVA using Statistix8 at $P \leq 0.05$.

Mention of trade names or commercial products is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the USDA/ARS.



Figure 2. Supplemental irrigation is important for peanut in the Southeast.



Figure 3: Drip tubing installation for 0.91 m and 1.83 m.



Figure 4: Drip tubing orientation and cost/hectare for 0.91 m and 1.83 m.

Results

- Irrigated crops had double the yield than non irrigated. (Table 1).
- 0.91 m lateral spacing had same yield as 1.83 m lateral spacing (Table 2).
- Net revenue for 0.91 m lateral spacing is not cost effective for corn.
- Drip tubing on 1.83 m spacing is cost effective for both crops.
- Non-irrigated crops for 2002 to 2004 are higher than state average.

Table 1. Corn grain yield, gross revenue, net revenue (subtracting tubing cost) and comparison to non-irrigated.

Lateral spacing	Yield kg/ha	Gross Revenue \$/ha	Net Revenue \$/ha	Delta [*] \$/ha
	Site 1			
0.91 m	10034a	967a	427	-146
1.83 m	11207a	1080a	810	273
Non-irrig.**	5950b	573b	573	---
	Site 2			
0.91 m	10433a	1006a	466	-70
1.83 m	10666a	1028a	758	222
Non-irrig.**	5562b	536b	536	---

* Delta = net return to drip irrigation over non-irrigation

** Corn yield 2000 kg/ha greater than state average.

Table 2. Cotton lint yield, gross revenue, net revenue (subtracting tubing cost) and comparison to non-irrigated.

Lateral spacing	Yield kg/ha	Gross Revenue \$/ha	Net Revenue \$/ha	Delta [*] \$/ha
	Site 1			
0.91 m	1142a	1245a	705	66
1.83 m	1140a	1242a	972	333
Non-irrig.**	586b	639b	639	---
	Site 2			
0.91 m	971a	1058a	518	-59
1.83 m	1132a	1234a	964	387
Non-irrig.**	455b	577b	577	---

* Delta = net return to drip irrigation over non-irrigation

** Cotton yield 100 kg/ha greater than state average.

Conclusions

- Surface drip irrigation is a viable irrigation option for corn and cotton.
- Surface drip has consistent yields across years.
- Laterals spaced in alternate row middles are economical.
- Surface drip net revenue is economically sustainable for small irregular shaped fields.

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