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Winter Annual Cover Crops in a Virginia No-till Cotton Production System: II. Cover Crop and Tillage Effects on Soil Moisture, Cotton Yield, and Cotton Quality

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Winter annual cover crops could help control soil erosion problems on sloping Piedmont soils in a no-till cotton (*Gossypium hirsutum* L.) production system. Field experiments were conducted from 1995 to 1997 to monitor the effects of winter annual cover crops in a no-till cotton production system on soil moisture, cotton yield, and cotton quality using the variety Deltapine 50. Cover crops, crimson clover (*Trifolium incarnatum* L.), hairy vetch (*Vicia vilosa* L.), hairy vetch and rye (*Secale cereale* L.), rye, wheat (*Triticum aestivum* L. em. Thell.), and white lupin (*Lupinus albus* L.), and two tillage systems (conventional and no-till) were arranged in a split-block design with four replications. Volumetric soil moisture was measured at 15, 30, 61, and 92 cm depths every 7 to 10 days during the 1996 and 1997 cotton growing seasons. Cotton was hand picked, weighed, and ginned for lint yield determination. Sub-samples of the ginned cotton from each plot were analyzed for quality (length, uniformity, strength, and micronaire). Soil moisture results indicated that no-till plots had higher soil moisture compared with conventional tillage during periods of drought in 1997. The no-till rye treatment conserved more soil moisture than any other cover crop treatment from pinhead square through the first three weeks of cotton flowering at the 15 cm depth. Cotton yield and quality were not affected by tillage system. However, the hairy vetch + rye cover crop treatment had higher cotton lint yields during 1995, compared with the wheat cover crop treatment, probably due to N immobilization by the wheat residue. Although differences occurred between cover crop treatments for the different quality parameters during 1995 and 1996, the market value of lint was only affected by micronaire in the 1995 growing season. High micronaire measurement for cover crop treatments in 1995 resulted from unseasonable heat unit accumulation in October and over maturity of the cotton fiber. Using winter annual cover crops in a no-till cotton production system provides greater soil moisture conservation during periods of drought, while producing lint fiber of similar yield and quality compared with a conventional tillage system.