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Winter Annual Cover Crops in a Virginia No-till Cotton Production System: I. Biomass Production, Ground Cover, and Nitrogen Assimilation

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Pages: 74-83

Agronomy and Soils[Full Text PDF](#) (146K)

Cotton (*Gossypium hirsutum* L.) may not provide sufficient surface residue to reduce erosion and protect the soil between crops. A winter annual cover crop might alleviate erosion during the time between cotton crops. This experiment was conducted to evaluate selected winter annual cover crops for biomass production, ground cover, and aboveground N assimilation. Six 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. Percentage ground cover measurements were taken each year prior to desiccation and immediately after cotton planting for 1995 and 1996. In 1997, additional measurements were taken 50 d after cotton planting. Hairy vetch + rye, rye, and wheat provided the most ground cover after cotton planting, while lupin provided the least. All cover crops, with the exception of lupin, provided enough ground cover (>30%) after cotton planting to comply with Natural Resource Conservation Service conservation standards, except during years with below normal winter temperatures. Fifty days after cotton planting, small grain residues provided more ($P < 0.05$) ground cover compared with legume residues. Averaged over the three experimental years, biomass production from the different cover crops ranged from 946 to 3,047 kg ha⁻¹. The average amount of aboveground N assimilated by cover crops ranged from 32 to 78 kg N ha⁻¹, and was closely related to the amount of cover crop biomass produced. Growth and biomass production of cover crops was greatly affected by the climatic conditions during each season.