

Tropical Cover Crop Mulch Systems for Low-External-Input Reduced Tillage Crop Production.

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Tropical small farm operators limited to low-external-input agroecosystems often rely exclusively on farm-derived resources for soil fertility management and pest solutions. Cover crops (CC) can provide many agroecosystem benefits, however, little is known in regards to the management of cover crops terminated with a roller-crimper in tropical vegetable cropping systems. At the University of the Virgin Islands in St. Croix, three cover crop species were terminated with a roller-crimper and the resulting surface sheet mulch was tested as a weed suppressive surface sheet mulch in Jalapeno pepper (*Capsicum annuum*) production. Four randomized treatments with three replications consisted of a fallow control (C) treatment (full tillage) compared to three CC species including pigeon pea [(*Cajanus cajan* cv. BRS Mandarin) PP], sunn hemp [(*Crotalaria juncea* cv. IAC-1) SH], and sun flower [(*Helianthus annuus* cv. Black Oil) SF]. Covers were established during the rainy season and terminated with a roller-crimper at maturity (112 days after planting). Jalapeno peppers (JP) were transplanted directly into the CC residue sheet mulch 7 days after CC termination and JP fruit was harvested to evaluate treatment effects on pepper yield. Six weeks after JP transplanting, all plots were split in half area-wise to compare JP yield from weeded (W) vs. non-weeded (NW) management. One half of each plot was hand weeded at 6, 9, and 12 weeks after JP transplant, and the other half of the plot remained unweeded allowing natural weedy vegetation to emerge. Sunn hemp yielded the highest amount of CC biomass at termination with $6,418 \pm 336$ kg/ha compared to SF and PP biomass at $4,747 \pm 336$ and $2,027 \pm 336$ kg/ha, respectively ($p \leq 0.05$). Sunn hemp resulted in 100% total weed prevention (grass and broad leaf; 0 ± 336 kg/ha) during the CC rotation compared to PP (667 ± 336 kg/ha) and SF (180 ± 336 kg/ha), and reduced weed density compared to the fallow control ($2,291 \pm 336$ total weeds) ($p \leq 0.05$). Based upon plant tissue nitrogen content and greater SH biomass; SH had the greatest level of potential nitrogen contribution at 92 ± 6.2 kg/ha compared to PP and SF ($p \leq 0.05$). At 3 weeks after CC termination, SH provided weed control by minimizing broad leaf (BL) weeds to 13 ± 80 kg/ha and grass (G) weeds to 0 ± 80 kg/ha which was less than both PP (BL, 416 ± 80 ; G, 93 ± 80) and SF (BL, 440 ± 80 ; G, 451 ± 80), but similar to the fallow control with 27 ± 80 kg/ha (BL) and 47 ± 80 kg/ha (G) ($p \leq 0.05$). Cover crop regrowth was observed after termination for both SH and PP, however, 0 regrowth was recorded for SF during the experiment. Yields of JP from W and NW plots followed similar trends with SH treatments producing $8,567 \pm 1,325$ kg/ha from W plots and $3,468 \pm 754$ kg/ha from NW plots. Pepper yields were lowest in PP (W $2,214 \pm 1,325$; NW 155 ± 754) and SF (W $2,697 \pm 1,325$; NW 617 ± 754) but similar to the fallow control (W $6,060 \pm 1,325$; NW $1,312 \pm 754$; $p \leq 0.05$). Results indicate that the use of SH terminated with a roller-crimper in low-external-input systems can reduce weeds, conserve soil nutrients, and return equitable yields of JP compared to JP produced with conventional tillage.