

Evaluation of winter rye cultivars and preemergence herbicides on weed control in no-tillage zucchini squash. Walters, S. Alan, Scott A. Nolte, Joseph L. Matthews, and Bryan G. Young. Three winter rye cultivars ('Elbon', 'Maton' and 'Wheeler') and a no cover crop were compared along with various herbicide treatments for their influence on weed control in tillage and no-tillage zucchini squash. A standard tillage production system with a ethalfluralin + clomazone herbicide mixture served as the control. The study was conducted at the Agronomy Research Center, in Carbondale, IL. Fertilizer applied was 80 lb N/A and 40 lb/A P₂O₅ and K₂O in 2001. All plots were sprayed with glyphosate at 2% v/v on April 15. 'Independence II' zucchini was transplanted in 36 inch rows, spaced 24 inch within the row, on May 17. Plots consisted of one row, 6 ft long arranged in a split-plot design with 4 replications. Main plots were no cover crop or one of three winter rye cover crop varieties and sub-plots were herbicide treatment. The herbicides were broadcast applied with a CO₂ pressurized sprayer using 8003 flat fan tips at 40 PSI in 20 GPA water. Rainfall was adequate following soil herbicide application. Weed population per 0.25 m² in the nontreated plots, mid-season, was <1 redroot pigweed and 3-4 large crabgrass.

Application information is listed below.

Date	May-15-02
Treatment	PRE
Air temperature (F)	72
Relative humidity (%)	39
Soil moisture	normal

Mulch coverage of the soil in the no-tillage areas depended on the winter rye cultivar: Wheeler-75%, Elbon- 95%, and Maton-95%, and the no cover crop-0%. Tillage resulted in about 15% coverage regardless of the cover crop used, but was 0% in the no cover crop.

In the no-tillage treatments, unacceptable injury and stunting of 'Independence II' zucchini squash plants were provided by halosulfuron and ethalfluralin + clomazone + halosulfuron treatments regardless of the presence of a winter ryegrass cover crop (see Table). Although insignificant amounts of squash injury and stunting occurred in the no-tillage ethalfluralin + clomazone treatment, squash injury and stunting was excessive in the tillage ethalfluralin + clomazone treatment when a winter ryegrass cover crop was used. All other treatments resulted in no significant amounts of injury or stunting to plants.

Redroot pigweed control at 28 and 56 days after planting (DAP) was greater in those treatments having a winter ryegrass cover crop compared to the no-cover crop production system. 'Wheeler' winter ryegrass produced less biomass than 'Elbon' or 'Maton' which resulted in less weed control (see Table) throughout the herbicide treatments. The no-tillage, winter ryegrass production system adequately controlled weeds in most instances and no herbicide or herbicide mixture stood out compared to another. The tillage, winter ryegrass production system utilizing Ethalfluralin + Clomazone resulted in less weed control compared to the no-tillage, winter ryegrass production system regardless of the herbicide or herbicide mixture used.

Zucchini yields were influenced by the treatments evaluated (see Table). The halosulfuron and ethalfluralin + clomazone + halosulfuron treatments resulted in lower total-season yields compared to other treatments regardless of the presence or absence of winter rye, which resulted from the significant amounts of injury and stunting provided to 'Independence II' zucchini plants by halosulfuron. When tillage was used, the ethalfluralin + clomazone treatments tended to provide lower yields regardless of the cover crop used; however, under no-tillage conditions, the ethalfluralin + clomazone treatments provided the highest yields within each production system, but was low for no cover crop system. The ethalfluralin + clomazone provided the greatest yields in the no-tillage treatment and was consistent regardless of whether a winter rye cover crop was used or not.

The no-cover crop, non-treated treatment provided low yields compared to the same treatment utilizing winter ryegrass, which was directly related to the winter ryegrass alone providing adequate weed control. The use of 'Maton' winter rye appeared to decrease yields, as the handweed treatments with this winter rye cultivar tended to have lower yields compared to the other handweed treatments (see Table). In most cases, the no cover crop treatment produced lower yields when no-tillage was used compared to the use of winter ryegrass. However, the no cover crop treatment produced similar yields to the winter ryegrass when tillage was used. (Dept. of Plant, Soil and General Agriculture, Southern Illinois University, Carbondale).

Table. Evaluation of winter rye cultivars and preemergence herbicides on weed control in no-tillage zucchini squash. (Walters, Nolte, Matthews and Young)

Treatment ^a	Application		Zucchini, days after planting ^b						Contol				Zucchini fruit weight lb/A
			Injury			Stunting			days after planting		DIGIS		
	Rate (lb/A)	Time	14 %	28 %	56 %	14 %	28 %	56 %	AMARE %	56 %	28 %	56 %	
Wheeler winter rye cover crop													
Tillage at planting +ethalfluralin&clomazone	1.0&0.31	PRE	0	40	0	0	40	0	79	70	88	58	15579
Ethalfuralin&clomazone	1.0&0.31	PRE	0	9	0	0	9	0	90	84	93	92	18271
Halosulfuron	0.031	PRE	0	33	0	0	33	0	94	91	90	75	14762
Ethalfuralin&clomazone +halosulfuron	1.0&0.31 +0.031	PRE	0	20	0	0	19	0	94	90	91	78	14218
Nontreated			0	0	0	0	0	0	80	75	61	56	12403
Handweed			0	0	0	0	0	0	99	99	99	99	24684
Elbon winter rye cover crop													
Tillage at planting +ethalfluralin&clomazone	1.0&0.31	PRE	0	54	0	0	54	0	82	71	91	70	11132
Ethalfuralin&clomazone	1.0&0.31	PRE	0	0	0	0	0	0	99	95	99	95	24624
Halosulfuron	0.031	PRE	0	38	0	0	35	0	97	95	97	93	13461
Ethalfuralin&clomazone +halosulfuron	1.0&0.31 +0.031	PRE	0	46	0	0	46	0	95	89	95	88	15730
Nontreated			0	0	0	0	0	0	94	89	83	78	20510
Handweed			0	0	0	0	0	0	99	99	99	99	25350
Maton winter rye cover crop													
Tillage at planting +ethalfluralin&clomazone	1.0&0.31	PRE	0	45	0	0	45	0	83	66	86	61	12040
Ethalfuralin&clomazone	1.0&0.31	PRE	0	0	0	0	0	0	99	88	99	88	21689
Halosulfuron	0.031	PRE	0	26	0	0	26	0	97	93	96	89	17394
Ethalfuralin&clomazone +halosulfuron	1.0&0.31 +0.031	PRE	0	24	0	0	24	0	99	91	95	90	15246
Nontreated			0	0	0	0	0	0	95	90	90	85	19874
Handweed			0	0	0	0	0	0	99	99	99	99	18090
No cover crop													
Tillage at planting +ethalfluralin&clomazone	1.0&0.31	PRE	0	5	0	0	5	0	86	73	95	84	14460
Ethalfuralin&clomazone	1.0&0.31	PRE	0	5	0	0	5	0	90	85	91	74	17424
Halosulfuron	0.031	PRE	0	11	0	0	14	0	88	88	68	30	8228
Ethalfuralin&clomazone +halosulfuron	1.0&0.31 +0.031	PRE	0	23	0	0	23	0	81	75	68	30	11828
Nontreated			0	0	0	0	0	0	0	0	0	0	7502
Handweed			0	0	0	0	0	0	99	99	99	99	24987
LSD			0	17	0	0	18	0	7	9	10	13	6869
P			1.0	0.01	1.0	1.0	0.01	1.0	0.01	0.01	0.01	0.01	0.01

^aAll plots sprayed (glyphosate 2.0 %) on April 15.

^bRatings at 14, 28, and 56 days after planting were also 16, 30, and 58 days after the PRE application, respectively. Ratings at 14, 28, and 56 days after planting were on May-31-02, Jun-14-02, and Jul-12-02, respectively.