Table 1. Cover crop and weed biomass (g/m^2) and density ($weeds/m^2$) of broadleaf and grass weeds as affected by cover crop and tillage treatments and cover crop at affect by tillage at the Horticulture Research Station, Ames, IA.

Treatment	Cover Crop Biomass[z] (kg/ha^2)	Broadleaf[y] Biomass (g/m^2)	Broadleaf[y] Density ($no./m^2$)	Grass Biomass (g/m^2)	Grass Density ($no./m^2$)
Cover Crop					
None	-	38.2 A[x]	232 A	24.1 A	45 A
Rye-Vetch	2871.4 A	32.5 A	166 A	11.4 A	15 A
Rye	2990.6 A	43.6 A	176 A	5.6 A	64 A
Tillage[w]					
CT	2799.1 a	60.0 a	345 a	27.0 a	78 a
ST	3062.9 a	16.2 b	38 b	0.4 b	5 b
Significance					
Cover Crop	0.8662	0.6304	0.0932	0.4295	0.3198
Tillage	0.4455	0.0002	<0.0001	0.0426	0.0107
*Cover Crop*Tillage*	0.1794	0.2999	0.5575	0.4288	0.2877

[z] Cover crop root and shoot biomass; sampled May 21 for CT and May 31, 2015 for ST.

[y] Weeds were sampled from the between row area on July 8th, 2015.

[x] Man separation of cover crop (uppercase letters) and tillage (lowercase letters) in columns based on least significant difference at $P \leq 0.05$.

[w] CT= conventional tillage, ST= strip tillage.

Table 2. Concentrations of soil macronutrients of muskmelons as affected by cover crops and tillage at the Horticulture Research Station Ames, IA.

Treatment	At planting[z]				Mid-Season				End of Season			
	Nitrogen		P (ppm)	K (ppm)	Nitrogen		P (ppm)	K (ppm)	Nitrogen		P (ppm)	K (ppm)
	NH_4^+-N (ppm)	NO_3—N (ppm)			NH_4^+-N (ppm)	NO_3—N (ppm)			NH_4^+-N (ppm)	NO_3—N (ppm)		
Cover Crop												
None	1.4 A[y]	3.3 A	77.7 A	286.7 A	0.6 A	3.2 A	73.0 A	232.7 A	0.1 A	2.4 A	66.9 A	193.4 B
Rye-Vetch	1.5 A	2.8 A	78.4 A	274.8 A	0.6 A	3.0 A	75.1 A	255.0 A	0.1 A	2.4 A	79.8 A	206.9 B
Rye	1.5 A	2.7 A	78.2 A	408.7 A	0.6 A	2.7 A	73.8 A	362.3 A	0.1 A	3.1 A	73.0 A	321.4 A
Tillage[x]												
CT	1.4 a	4.3 a	78.0 a	337.9 a	0.6 a	4.3 a	80.3 a	294.5 a	0.1 a	3.6 a	75.9 a	257.8 a
ST	1.5 a	1.6 b	78.0 a	309.0 a	0.6 a	1.6 b	81.0 a	272.3 a	0.1 a	1.7 a	70.6 a	226.6 a
Significance												
Cover Crop	0.7181	0.4955	0.9965	0.1864	0.4325	0.6786	0.5409	0.1107	0.4331	0.2829	0.5313	0.0386
Tillage	0.3662	<0.0001	0.9507	0.2835	0.4276	0.0004	0.9137	0.4022	0.0730	<0.0001	0.4898	0.3709
*Cover Crop*Tillage*	0.2736	0.5691	0.9374	0.2287	0.4325	0.7163	0.9841	0.3431	0.0537	0.1774	0.9869	0.2875

[z] Soil samples were taken from the in row area on June 16th, July 21st and September 16th,2015.

[y] Mean separation of cover crop(uppercase letters) and tillage (lowercase letters) in columns based on least significant difference at $P \leq 0.05$.

[x] CT= conventional tillage, ST= strip tillage.

Table 3. Soil measurements of acidity (pH), electroconductivity (EC), cation exchange capacity (CEC), and percent soil organic matter (%SOM) from the root zone of muskmelons as affected by cover crops and tillage at the Horticulture Research Station, Ames, IA.

Treatment	At planting[z]				Mid-Season				End of Season			
	pH	EC[y]	CEC[x]	% SOM	pH	EC	CEC	% SOM	pH	EC	CEC	% SOM
Cover Crop												
None	6.1 A	0.31 A	11.5 B	2.3 A	6.4 A	0.17 B	10.4 A	2.3 A	6.2 A	0.22 A	11.2 A	2.4 A
Rye-Vetch	5.9 A	0.29 A	13.5 A	2.6 A	5.8 B	0.21 A	12.1 A	2.6 A	5.9 A	0.21 A	12.4 A	2.5 A
Rye	5.9 A	0.28 A	11.5 B	2.6 A	6.0 B	0.20 AB	10.5 A	2.5 A	6.0 A	0.23 A	11.5 A	2.5 A
Tillage												
CT[v]	5.9 a	0.34 a	12.2 a	2.5 a	6.2 a	0.20 a	10.9 a	2.5 a	6.0 a	0.25 a	11.8 a	2.4 a
ST	6.1 a	0.24 b	12.2 a	2.4 a	6.0 a	0.19 a	11.1 a	2.5 a	6.1 a	0.19 b	11.6 a	2.5 a
Significance												
Cover Crop	0.3505	0.2794	0.0379	0.1994	0.0167	0.0303	0.1046	0.2782	0.3002	0.7344	0.3456	0.7669
Tillage	0.0756	<0.0001	0.9292	0.6763	0.1876	0.6992	0.8029	>0.9999	0.0856	0.0012	0.6750	0.9106
*Cover*Tillage*	0.3731	0.8763	0.6627	0.3538	0.8782	0.0063	0.5785	0.5217	0.3657	0.1318	0.3663	0.1274

[z] Soil samples were taken from the in row area on June 16th, July 21st and September 16th,2015

[y] EC=Electrical conductivity (mS/cm)

[x] CEC=Cation Exchange Capacity (meq/100g of soil)

[w] Mean separation of cover crop(uppercase letters) and tillage (lowercase letters) in columns based on least significant difference at $P \leq 0.05$.

[v] CT= conventional tillage, ST= strip tillage.

Table 4. Marketable yield and nonmarketable (cull) yield data of muskmelons as affected by cover crop and tillage treatments at the Horticulture Research Station, Ames, IA.

Treatment	Marketable							Cull
	Yield (kg/ha)	Yield (no. fruit/ ha)	Fruit Density (g/cm^3)	Fruit Length (cm)	Fruit Width (cm)	Cavity Length (cm)	Cavity Width (cm)	Weight (kg/ha)
Cover Crop								
None	1813 A[z]	5160 A	0.96 A	19.53 A	17.31 A	13.49 A	7.90 A	3209 A
Rye-Vetch	2343 A	6709 A	0.95 A	19.33 A	17.64 A	13.04 A	7.93 A	2593 A
Rye	2478 A	7159 A	0.92 A	19.58 A	17.35 A	13.34 A	8.04 A	2952 A
Tillage[y]								
CT	2551 a	6607 a	0.92 b	19.93 a	17.68 a	13.85 a	8.13 a	3130 a
ST	1871 b	6077 a	0.97 a	19.02 b	17.18 b	12.73 b	7.78 b	2706 a
Significance								
Cover Crop	0.2866	0.1385	0.4795	0.8701	0.4169	0.5515	0.7729	0.5984
Tillage	0.0342	0.4802	0.0434	0.0428	0.0331	0.0047	0.0248	0.0851
*Cover Crop*Tillage*	0.5911	0.4996	0.9537	0.2503	0.0516	0.2636	0.3860	0.8337

[z] Mean separation of cover crop (uppercase letters) and tillage (lowercase letters) in columns based on least significant difference at $P \leq 0.05$.

[y] CT= conventional tillage, ST= strip tillage.

Table 5. Frequency of a positive result from detection of *Listeria innocua* on the surface of muskmelons as affected by cover crops and tillage treatments

Treatment		Positive
Cover Crop	Tillage	
None	CT[z]	38%
	ST	0%
Rye-Vetch	CT	13%
	ST	13%
Rye	CT	13%
	ST	13%

[z]CT= conventional tillage, ST= strip tillage.

Table 6. Frequency of a positive result from detection of *Listeria innocua* in soil samples as affected by cover crops irrespective of tillage treatments at the Horticulture Research Station, Ames, IA in 2015.

Treatment	May[z]	June	July	August
	Positive	Positive	Positive	Positive
Cover Crop				
None	100%	100%	86%	75%
Rye-Vetch	100%	25%	0%	0%
Rye	100%	37%	0%	0%

[z] Soil samples were taken on May 17th, June 15th, July 15th, and August 18th, 2015.

Figure 1. Roller crimping in the cover crop plots.

Figure 2. Sample preparation for analysis of *Listeria innocua* on melons.

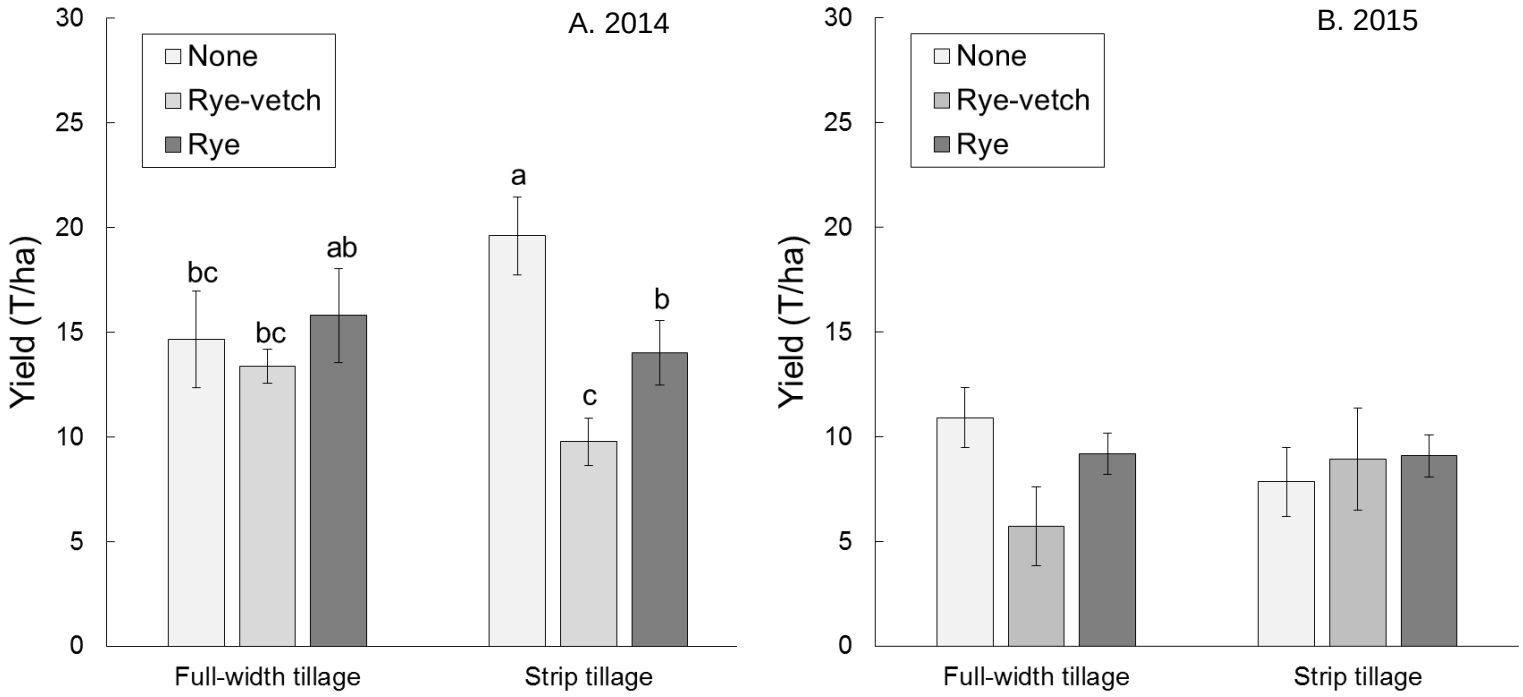

Figure 3. Effects of tillage and cover crop residue on pickling cucumber yield in long-term trial, SWMREC, 2014 and 2015. In 2014 (A), in the absence of cover crops, strip tillage improved yields relative to full-width tillage. However, when cover crops were used in strip tillage, cucumbers were suppressed. In 2015 (B), neither tillage nor cover crops had any detectable effects on yields, which were low and highly variable.

Figure 4. Cucumbers in strip-tillage + rye cover crop treatment, in the MI long-term tillage trial, Southwest Michigan Research and Extension Center, 2015. Patchy chlorosis and stunting was visible in some cover crop plots.

Figure 5. Soil erosion in full-width tillage treatment following heavy rain, Southwest Michigan Research and Extension Center, 2014.

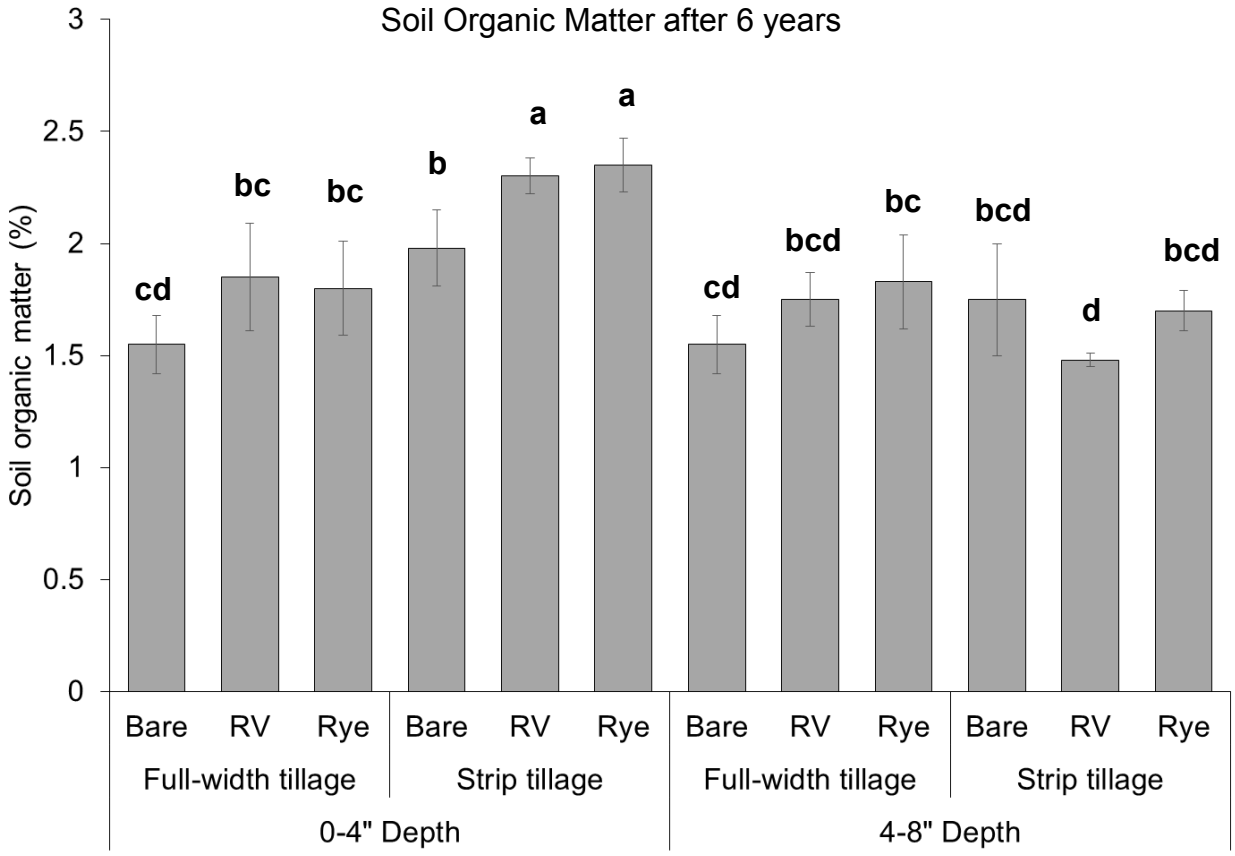

Figure 6. Soil organic matter (SOM) at two depths following 6 years of strip tillage and cover cropping, SWMREC, 2015. Strip-tillage with either a rye or rye-vetch cover crop had approximately 50% more SOM in the top 4" of soil compared to full-width tillage with no cover crop. However, few differences were observed at the 8" depth. Cover crops had no effect on SOM in the full-width tillage treatments.

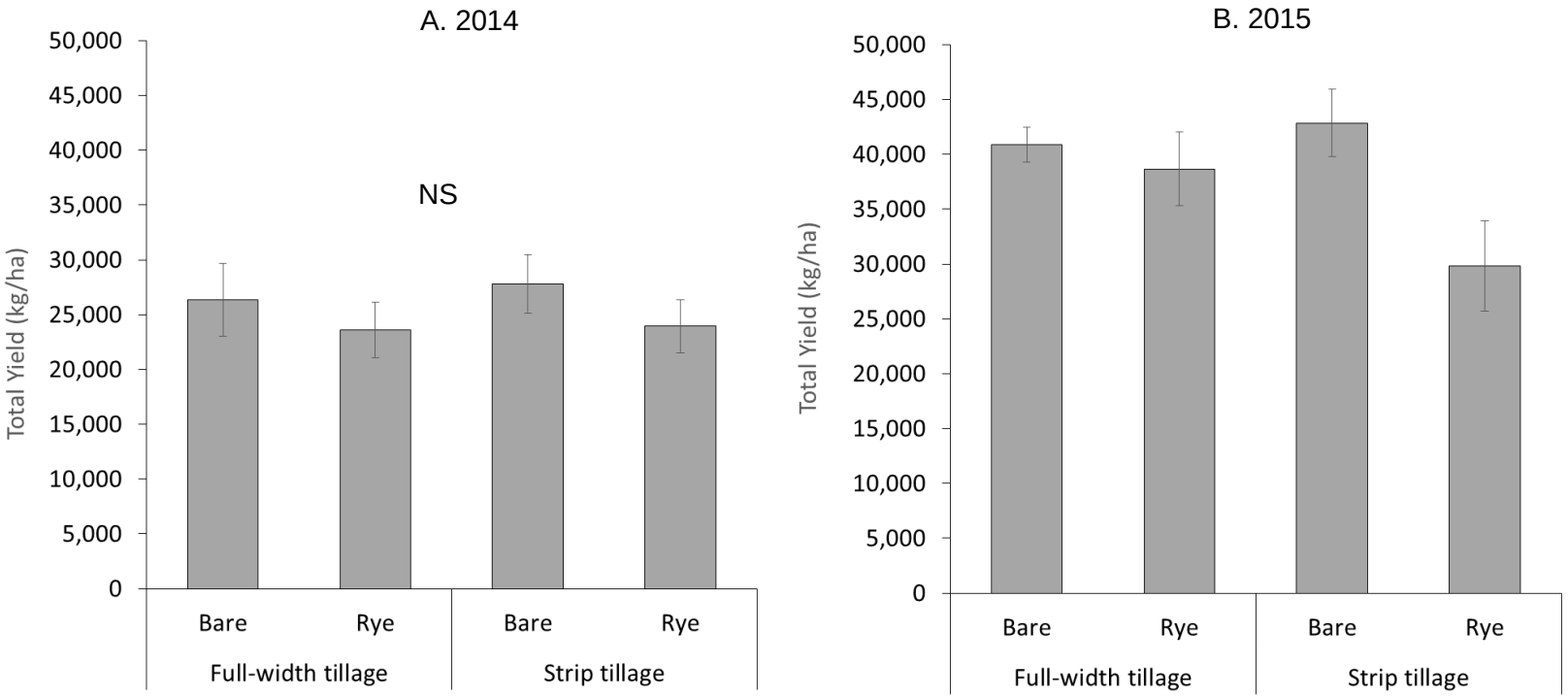

Figure 7. Effects of tillage and cover crops on acorn squash yields, Southwest Michigan Research and Extension Center, 2014 and 2015.