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# Corrigendum: Weed community composition in simple and more diverse cropping systems

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## KEYWORDS

weed community composition, diversity, evenness, richness, Midwestern-United States, agroecology, integrated weed management

## A Corrigendum on

## Weed community composition in simple and more diverse cropping systems

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The **Data Availability Statement** has been updated to reflect errors in the original dataset. The statement originally read:

“The data from this present study is available at <https://doi.org/10.25380/iastate.19111376.v1>.”

(Note, the original dataset is still available at that link.)

The statement has been updated to read:

“The data from this present study is available at <https://doi.org/10.25380/iastate.19111376.v2>.”

In the published article, the models for oat and alfalfa yield data were not explicitly stated. The missing models were two reduced versions of the model described in **Equation 2** to appropriately describe the whole-plot harvesting practice applied on oat and alfalfa as detailed in the **Crop Yields** section of the published article. The reduced models are provided below.

$$R_{ijl} = \mu + B_i + C_j + Y_l + BY_{il} + YC_{lj} + \epsilon_{ijl} \quad (3)$$

where,

$R$  is oat yield,

$\mu$  is the overall mean,

$B$  is the block,

$Y$  is the year,

$C$  is the crop identity,

$BY$  is the block within a year,

$YC$  is the interaction between crop identity and year,

$\epsilon_{il}$  is the residual.

$$R_{il} = \mu + B_i + Y_l + \epsilon_{il} \quad (4)$$

where,

$R$  is alfalfa yield,

$\mu$  is the overall mean,  
 $B$  is the block,  
 $Y$  is the year,  
 $\epsilon_{il}$  is the residual.

These have been inserted in the **Model Fitting** section, after the sentence “ $R$  is the individual crop yield, and all the terms in the right-hand side of the model are as defined in Equation (1)”.

As a result of this addition, the text in this section “A different linear mixed-effects model was used to analyze corn, soybean, and oat yields (lme4 version 1.1-27.1, Bates et al., 2015):” has been replaced with “A different set of linear mixed-effects models was used to analyze corn, soybean, and oat yields (lme4 version 1.1-27.1, Bates et al., 2015):” and the text “With this model (Equation 2), we tested the hypothesis that the yield of the same crop species (corn, soybean, and oat) did not differ between rotations.” has been replaced with “With these models (Equations 2, 3, and 4), we tested the hypothesis that the yield of the same crop species (corn, soybean, and oat) did not differ between rotations.”

In the published article, there were 11 errors in **Materials and Methods**, **Table 1**.

Error 1: The harvest dates were not listed in chronological order relative to other field activities.

Error 2: Missing the herbicide application dates for corn and soybean.

Error 3: Inconsistent format in corn and soybean planting dates of 2017 and 2018 relative to the rest of the dates.

Error 4: Erroneous inclusion of interrow cultivation date of 2017 corn under conventional herbicide.

Error 5: Missing the harvest date of soybean following corn under conventional weed management in 2017.

Error 6: Rounding errors on isoxaflutole amount in 2018 through 2020.

Error 7: Wrong month of 2019 oat harvest.

Error 8: Missing the stubble clipping dates of 2019 oat and alfalfa.

Error 9: Missing three weed sampling dates of 2019 oat and alfalfa.

Error 10: Wrong first date of 2019 alfalfa harvest.

Error 11: Missing the stubble clipping date of 2020 alfalfa (for the oat intercrop that was harvested in 2019).

The updated version is shown below.

In the published article, the accompanying data set had three errors. The first error was with oat yield, in which the crop identity for oat yield data in Plot 47 in 2020 was mislabeled as O4 instead of O3. This error led to an inaccurate model output of oat yields in **Table 2** (C) and the “oat grain” panel of **Figure 1**. In particular, the mean and 95% CI of O3 yield was 3.1 (2.5, 3.8) Mg ha<sup>-1</sup> and the mean and 95% CI of O4 was 3.4 (2.7, 4.2) Mg ha<sup>-1</sup>. The second error was with alfalfa hay yield obtained from the National Agricultural Statistics Service (NASS). The hay yield, originally in ton acre<sup>-1</sup> unit was converted to Mg ha<sup>-1</sup> unit incorrectly, neglecting the area unit. As a result, the dashed and solid lines for Iowa and Boone yields in the “alfalfa hay” panel were plotted at 3.3 and 3.0 Mg ha<sup>-1</sup>, respectively. The third error was with alfalfa yield adjustment. The data were plotted in dry mass basis, instead of at 150 g H<sub>2</sub>O kg<sup>-1</sup>, as stated in the **Crop Yields** section in the published article. As a result, the yield at its 95% CI was plotted at 7.3 (3.9, 10.7) Mg ha<sup>-1</sup>, respectively. The data published at <https://doi.org/10.25380/iastate.19111376.v1> has been updated and is available at <https://doi.org/10.25380/iastate.19111376.v2>.

The updated version of **Table 2** is shown below.

**Figure 1** has been updated. The caption originally read “Mean crop yields by rotation from 2017 to 2020. The color-coded bars show crop yields (Mg ha<sup>-1</sup>) in the experiment plots. The error bars show the 95% confidence intervals. The solid horizontal lines show mean yields for Iowa and dashed lines show mean yields for Boone County. Corn, soybean, and alfalfa yields in the experiment were averaged over 4 years, oat grain yields in the experiment were averaged over 2017, 2019, and 2020 because in 2018 oat was harvested for hay. Boone County and Iowa hay yields were averaged over 2017 and 2018 because 2019 and 2020 yields were not available at this writing.” The corrected figure and its caption appear below. The updated caption explicitly states how Iowa and Boone County yields were compiled.

The authors apologize for these errors and state that this does not change the scientific conclusions of the article in any way.

**TABLE 1** | Crop variety or hybrid and management from 2017 through 2020 field seasons.

Year	Activity or input	Low herbicide	Conventional herbicide	Low herbicide	Conventional herbicide
2017	Hybrid or variety	<b>Corn</b> Epley E1420	<b>Corn</b> Epley E1420	<b>Soybean</b> Latham L2758 R2	<b>Soybean</b> Latham L2758 R2
	Planting date	9-May	9-May	16-May	
	Interrow cultivation date	Jun. 7	Jun. 7	none	none
	Harvest date	Oct. 19	Oct. 19	Oct. 19	
	Herbicides applied (kg ai./ha)	POST: tembotrione (0.049) applied May 31, interrow cultivated Jun. 7	PRE: thiencarbazone methyl (0.037), isoxaflutole (0.093)	PRE: flumioxazin (0.109); POST: glyphosate as potassium salt (1.249), acifluorfen (0.224)	PRE: flumioxazin (0.109); POST: glyphosate as potassium salt (1.249), acifluorfen (0.224)
Total (kg a.i./ha)	0.049	0.13	1.581	1.581	
2018	Weed sampling date	Sep. 5 and 6	Sep. 5 and 6	Sep. 6, 7, and 8	Sep. 6, 7, and 8
	Hybrid or variety	Epley E1420	Epley E1420	Latham L2758 R2	Latham L2758 R2
	Planting date	8-May	8-May	Jun. 3	Jun. 3
	Interrow cultivation date	Jun. 4	none	none	none
	Harvest date	Oct. 30	Oct. 30	Oct. 29	Oct. 29
Herbicides applied (kg ai./ha)	POST: tembotrione (0.054)	PRE: thiencarbazone methyl (0.037), isoxaflutole (0.092); POST: mesotrione (0.105), nicosulfuron (0.053)	PRE: flumioxazin (0.096); POST: glyphosate as potassium salt (1.540), lactofen (0.140)	PRE: flumioxazin (0.096); POST: glyphosate as potassium salt (1.540), lactofen (0.140)	
Total (kg a.i./ha)	0.054	0.287	1.776	1.776	
2019	Weed sampling date	Sep. 11, 12, and 13	Sep. 11, 12, and 13	Sep. 17, 19, 20, and 21	Sep. 17, 19, 20, and 21
	Hybrid or variety	Epley E1730	Epley E1730	Latham 2684 L (Liberty Link)	Latham 2684 L (Liberty Link)
	Planting date	Jun. 3	Jun. 3	Jun. 10	Jun. 10
	Interrow cultivation date	none, due to weather adversity	none	none	none
	Herbicides applied (kg ai./ha)	POST: tembotrione (0.049)	PRE: thiencarbazone methyl (0.037), isoxaflutole (0.092); POST: mesotrione (0.105), nicosulfuron (0.053)	PRE: flumioxazin (0.096); POST: glufosinate ammonium (0.594), clethodim (0.136)	PRE: flumioxazin (0.096); POST: glufosinate ammonium (0.594), clethodim (0.136)
Total (kg a.i./ha)	0.049	0.287	0.826	0.826	
2020	Weed sampling date	Sep. 17 and 18	Sep. 17 and 18	Sep. 30	Sep. 30
	Hybrid or variety	Epley E1730	Epley E1730	Latham 2684 L (Liberty Link)	Latham 2684 L (Liberty Link)
	Planting date	Apr. 23	Apr. 23	13-May	13-May
	Interrow cultivation date	Jun 8	none	none	none
	Harvest date	Oct. 2	Oct. 2	Sep. 23	Sep. 23
Herbicides applied (kg ai./ha)	POST: tembotrione (0.051)	PRE: thiencarbazone methyl (0.037), isoxaflutole (0.092); POST: mesotrione (0.105), nicosulfuron (0.053)	PRE: flumioxazin (0.096); POST: glufosinate ammonium (0.594), clethodim (0.136)	PRE: flumioxazin (0.096); POST: glufosinate ammonium (0.594), clethodim (0.136)	
Total (kg a.i./ha)	0.051	0.287	0.826	0.826	
2017	Weed sampling date	Sep. 14 and 15	Sep. 14 and 15	Sep. 16	Sep. 16
	Hybrid or variety	<b>Oat</b> IN09201	<b>Oat</b> IN09201	<b>Alfalfa</b> Leafguard	<b>Alfalfa</b> Leafguard
	Planting date	Apr. 12	Apr. 12	Mar. 29, 2016	Mar. 29, 2016
	Stubble clipping	Aug. 7 in O3 and O4 and Sep. 11 in O4	Aug. 7 in O3 and O4 and Sep. 11 in O4	Aug. 10, 2016	Aug. 10, 2016
	Harvest date	Jul. 17	Jul. 17	Jun. 6, Jul. 7, Aug. 7, and Sep. 11	Jun. 6, Jul. 7, Aug. 7, and Sep. 11
Weed sampling date	Sep. 25, 27, 28, and 29	Sep. 25, 27, 28, and 29	Sep. 25, 27, 28, and 29	Sep. 25, 27, 28, and 29	

(Continued)

TABLE 1 | Continued

Year	Activity or input	Low herbicide	Conventional herbicide	Low herbicide	Conventional herbicide
2018	Hybrid or variety	IN09201	IN09201	Leafguard	Leafguard
	Planting date	Apr. 24	Apr. 24	Apr.12, 2017	Apr.12, 2017
	Stubble clipping	Sep. 11	Sep.11	Sep. 11, 2017	Sep.11, 2017
	Harvest date	Jul.20	Jul. 20	Jun. 4, Jul. 9, and Sep. 10	Jun. 4, Jul. 9, and Sep. 10
Weed sampling date	Sep. 26, Oct. 4, 15, 16, 18, and 19	Sep.26, Oct. 4, 15, 16, 18, and 19	Sep.26, Oct. 4, 15, 16, 18, and 19	Sep.26, Oct. 4, 15, 16, 18, and 19	
2019	Hybrid or variety	IN09201	IN09201	Leafguard	Leafguard
	Planting date	Apr.16	Apr. 16	Apr. 24, 2018	Apr. 24, 2018
	Stubble clipping	none	none	none	none
	Harvest date	Jul. 24 and 29	Sep.24 and 29	Jun. 7, Jul. 12, Aug. 26, 2019	Jun. 7, Jul. 12, Aug. 26, 2019
Weed sampling date	Sep. 23, 24, 25, and 26, Oct. 3, 4, 7, and 8	Sep.23, 24, 25, and 26, Oct. 3, 4, 7, and 8	Sep. 23, 24, 25, and 26, Oct. 3, 4, 7, and 8	Sep. 23, 24, 25, and 26, Oct. 3, 4, 7, and 8	
2020	Hybrid or variety	IN09201	IN09201	Leafguard	Leafguard
	Planting date	Apr. 2, May 7*	Apr. 2, May 7*	Apr.16, 2019	Apr.16, 2019
	Stubble clipping	none	none	none	none
	Harvest date	Jul. 24	Jul. 24	Jun. 2, Jul. 6, and Aug. 17	Jun. 2, Jul. 6, and Aug. 17
Weed sampling date	Sep. 23, 24, and 29, Oct. 2, 6, 7, and 8	Sep. 23, 24, and 29, Oct. 2, 6, 7, and 8	Sep. 23, 24, and 29, Oct. 2, 6, 7, and 8	Sep. 23, 24, and 29, Oct. 2, 6, 7, and 8	

Corn was planted at 12950 seeds/ha, soybean at 56656 seeds/ha, oat at 80.7 kg/ha, red clover and alfalfa at 19.1 kg/ha. PRE and POST herbicide in corn and soybean refers to pre-emergence and post-emergence, relative to weed emergence. No herbicide was applied in oat, red clover, and alfalfa. 'Belle' (in 2017) or 'Mammoth' (in 2018 - 2020) red clover was intercropped with oat in the 3-year rotation (O3). Alfalfa was intercropped with the oat phase in the 4-year rotation (O4) and was overwintered to the following year as a sole crop (A4).

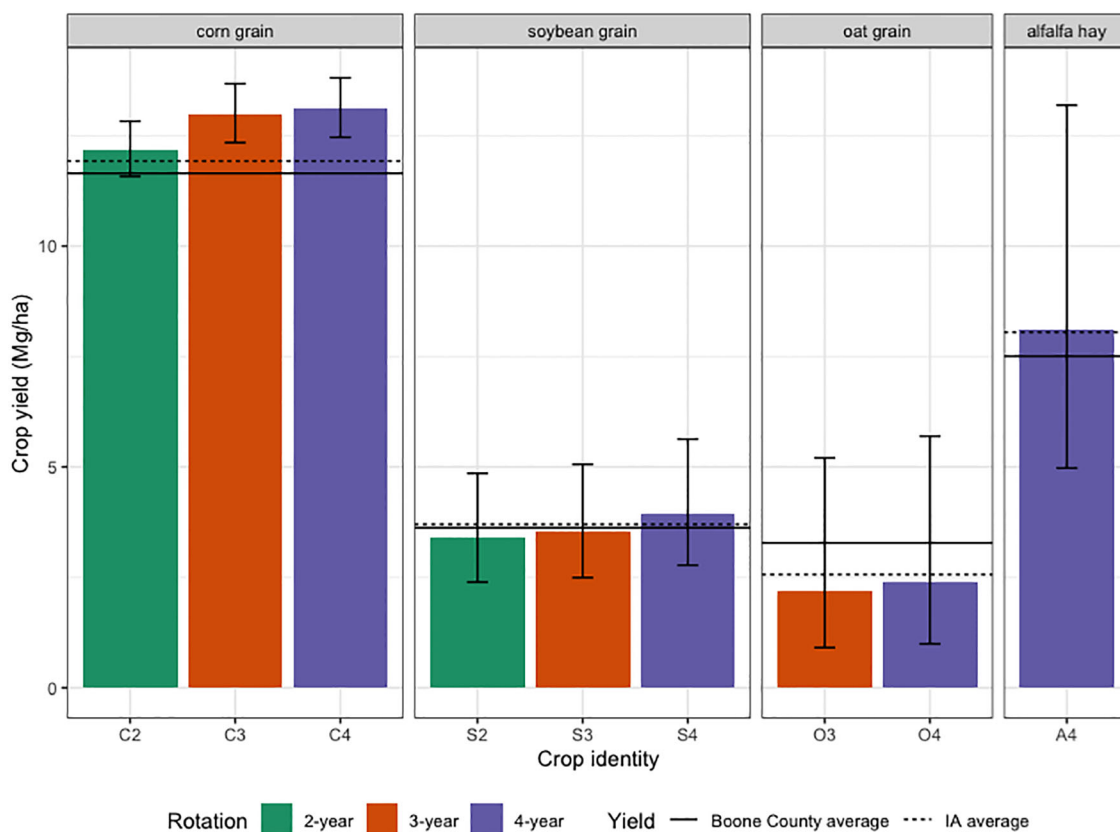
\*Oat was replanted in 2020 due to poor germination.

**TABLE 2** | Contrasts of rotation effect (expressed by Crop ID) on crop yields.

Source of variation	ANOVA				Comparison		
	df1	df2	F	p	contrast	ratio	p
<b>(A) Corn</b>							
Crop ID	2	6	3.19	0.1138	C2 vs C3	0.94	0.1882
Corn weed management	1	3	0.32	0.6088	C2 vs C4	0.93	0.1278
Crop ID x Corn weed management	2	6	2.20	0.1914	C3 vs C4	0.99	0.9507
<b>(B) Soybean</b>							
Crop ID	2	6	8.22	0.0191	S2 vs S3	0.96	0.5499
Corn weed management	1	3	0.18	0.7018	S2 vs S4	0.86	0.0181
Crop ID x Corn weed management	2	6	0.62	0.5677	S3 vs S4	0.90	0.0670
<b>(C) Oat</b>							
Crop ID	1	2	1.14	0.3979	O3 vs O4	0.91	0.3979

The abbreviations on the contrast column are crop identities, which are the combinations of the first letter in crop species names and the rotation in which it occurred.

Corn weed management: low herbicide or conventional. Crop ID: crop species and the cropping system in which it occurred: C2 - corn in the 2-year rotation, C3 - corn in the 3-year rotation, C4 - corn in the 4-year rotation, S2 - soybean in the 2-year rotation, S3 - soybean in the 3-year rotation, S4 - soybean in the 4-year rotation, O3 - oat in the 3-year rotation, and O4 - oat in the 4-year rotation.



**FIGURE 1** Mean crop yields by rotation from 2017 to 2020. The color-coded bars show crop yields ( $\text{Mg ha}^{-1}$ ) in the experiment plots. The error bars show the 95% confidence intervals. The solid horizontal lines show mean yields for Iowa and dashed lines show mean yields for Boone County. Corn, soybean, and alfalfa yields in the experiment were averaged over four years, oat grain yields in the experiment were averaged over 2017, 2019, and 2020 because in 2018 oat was harvested for hay. Because county-specific alfalfa hay yields in 2019 and 2020 were unavailable at this writing, Boone County alfalfa yield (solid line) was averaged over 2017 and 2018 and Iowa hay yield (dashed line) was averaged from all county-based values in 2017 and 2018 and two state-based values in 2019 and 2020.

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