Weed Technology 2012 26:432–437

Corn Replant Situations: Herbicide Options and the Effect of Replanting into Partial Corn Stands

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Inadequate corn stands due to extreme weather conditions may require producers to replant their corn fields. The use of GR corn, however, can result in difficulty in managing replanted corn without experiencing yield loss. Therefore, the objectives of this research were to evaluate the herbicide options for control of GR corn in a corn replant situation and to determine the effect of corn replanted into various initial corn stands on grain yield. Two field studies were conducted to accomplish the objectives. The first experiment was designed to identify the most efficacious herbicide treatment for GR corn removal in a corn replant situation. Clethodim (51 g ai ha^{-1}) applied 6 d prior to replanting, paraquat (700 g ai ha^{-1}) plus metribuzin (160 g ai ha^{-1}) applied at replanting, and glufosinate (450 g ai ha^{-1}) applied at replanting along with a sequential treatment 3 wk later provided 96 to 100% control of the initial corn stand and resulted in the highest yield. If corn from the first planting remains, the interaction between different sized plants can reduce yield of corn. Thus, a second field experiment was conducted to evaluate the influence on grain yield of corn replanted into various initial corn stands. Corn stands of 0, 20,000, 40,000, 60,000, 80,000, and 100,000 plants ha^{-1} were established and either followed by a corn replant at 80,000 seeds ha^{-1} or not replanted. Initial stands $\geq$ 60,000 plants ha^{-1} did not require a replant to maximize yield. Initial corn stands $\leq$ 40,000 plants ha^{-1} required a replant with initial stand control to maximize grain yield. The percent yield contribution from an initial stand of 20,000 plants ha^{-1} was 20% greater than the same population replanted a few weeks later, which showed the competitive advantage to earlier planting even at the lowest initial corn stand. Because of this competitive advantage, an initial stand must be removed to maximize corn yield in a replant situation.
Nomenclature: Clethodim; glufosinate; metribuzin; paraquat; corn, *Zea mays* L.
Key words: Glyphosate-resistant corn, replant.

El establecimiento inadecuado del maíz debido a condiciones climáticas extremas podría hacer que los productores requieran resembrar sus campos de maíz. Sin embargo, el uso de maíz GR puede causar dificultades para manejar el maíz de resiembra sin sufrir pérdidas en rendimiento. Así los objetivos de esta investigación fueron evaluar opciones de herbicidas para el control de maíz GR en una situación de maíz de resiembra y determinar el efecto en el rendimiento de grano del maíz resembrado dentro de diferentes situaciones de maíz establecido previamente. Dos estudios de campo fueron realizados para alcanzar estos objetivos. El primer experimento fue diseñado para identificar el tratamiento de herbicidas más eficaz para eliminar el maíz GR en una situación de maíz de resiembra. Clethodim (51 g ai ha^{-1}) aplicado 6 d antes de resembrar, paraquat (700 g ai ha^{-1}) más metribuzin (160 g ai ha^{-1}) aplicados en la resiembra, y glufosinate (450 g ai ha^{-1}) aplicado en la resiembra seguido de otra aplicación 3 semanas después brindaron 96 a 100% de control del maíz establecido inicialmente y resultaron en los rendimientos más altos. Si plantas de la primera siembra se mantienen establecidas, la interacción entre plantas de diferentes tamaños puede reducir el rendimiento del maíz. Por esto se realizó un segundo experimento de campo para evaluar la influencia sobre el rendimiento en grano del maíz resembrado dentro de diferentes situaciones de maíz establecido previamente. Plantaciones con 0, 20,000, 40,000, 60,000, 80,000 y 100,000 plantas ha^{-1} fueron establecidas y seguidas ya sea por una resiembra con 80,000 plantas ha^{-1} o sin resiembra. Plantaciones iniciales con 60,000 plantas ha^{-1} no requirieron resiembra para maximizar el rendimiento. Plantaciones iniciales con 40,000 plantas ha^{-1} requirieron una resiembra además de control de la plantación inicial para maximizar el rendimiento en grano. El porcentaje de contribución de la plantación inicial de 20,000 plantas ha^{-1} fue 20% superior al de la misma población resembrada unas pocas semanas después, lo que mostró la ventaja competitiva de la siembra temprana inclusive a la densidad de siembra inicial más baja. Por esta ventaja competitiva, las plantas establecidas inicialmente deben ser eliminadas para maximizar el rendimiento del maíz de resiembra.

In 2011, farmers planted over 37 million hectares of corn, a four million hectare increase from 2004 (USDA-NASS 2011). Federal mandates require that, by 2016, ethanol production must increase by 150% from 2010 production totals; therefore the number of corn hectares will likely continue to increase (Malcolm and Aillery 2009). Farmers in the Midwest now plant corn earlier than they did in the 1980s. In Indiana and Ohio, from 1979 to 1983, May 2 and April 29 were the average dates for the first 10% of the corn hectares to be planted, whereas from 2001 to 2005, April 22 and April 23 were the average dates for 10% of the corn hectares to be planted (Kucharik 2006). Earlier planting has resulted in more corn being planted in marginal and poor soil conditions, which increases the likelihood of reduced corn stands (Nafziger et al. 1991) that may need to be replanted. Extreme weather events, such as a late frost, hail, or excessive rain (ponding and flooding), can also result in poor corn stands.

The decision to replant corn is complex and involves a number of factors. Corn growth stage is important since the

DOI: 10.1614/WT-D-11-00158.1

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apical meristem remains below the soil surface until the V5 to V6 growth stage (Abendroth et al. 2011), which allows the plant to withstand some aboveground damage (Johnson et al. 1990). Once plant health and stand count are determined, the initial planting date, initial stand uniformity, yield potential of the initial stand, estimated replant date, yield potential if replanted, and estimated replant costs should be considered in the replant decision (Nielsen 2002). In Indiana, corn yield potential decreases 0.06 to 0.12 Mg ha^{-1} d^{-1} when planting is delayed beyond May 10 (Nielsen 2002). Also, replanting a field does not guarantee an acceptable stand (Anonymous 2006). Ultimately, determining if a replant is necessary is an uncertain decision. However, when it is determined that a replant is justified, management of the initial stand may be necessary.

In corn replant situations, many agronomists state that removal of the initial stand is essential to optimize yield (Johnson et al.1990; Larson 2009). However, peer reviewed literature on actual replant situations is limited and the assumption that initial corn stands reduce yield is often based on data from uneven corn emergence and plant height variation studies. When 25% of a corn stand emerged 1.5 wk late, grain yield was reduced 6 to 8% (Nafziger et al. 1991). In the same study, a 3-wk delay in planting 25, 50, or 75% of the plants resulted in yield losses of 10, 20, and 22%, respectively. Liu et al. (2004) found that one out of six plants with a two-leaf stage delay in emergence reduced yield by 4%, and one out of six plants with a four-leaf stage delay reduced yield by 8%.

In 2011, greater than 70% of the U.S. corn crop was glyphosate-resistant (GR) (USDA-ERS 2011). Before the widespread adoption of GR corn, glyphosate was the primary herbicide used to control an unwanted corn stand in a corn replant situation. Now, herbicides other than glyphosate must be relied upon to control unwanted corn stands. One option for controlling GR corn is to replant with glufosinate-resistant corn and control the initial stand with glufosinate (Steckel et al. 2009). However, the problem with this method is twofold. First, many of the popular hybrids stacked with glufosinate resistance are also GR. The second issue is that glufosinate is not as effective on volunteer corn as glyphosate, especially early in the growing season (Hager et al. 2005). Cool temperatures reduce glufosinate activity (Steckel et al. 2006) because of a decrease in translocation to the meristematic regions (Kumaratilake and Preston 2005). Therefore, herbicides other than glufosinate must be considered to control GR corn. A study conducted in Tennessee by Steckel et al. (2009) reported that treatments of clethodim at 0.05 kg ai ha^{-1}, paraquat at 0.84 kg ai ha^{-1}, or paraquat at 0.70 kg ai ha^{-1} plus simazine at 0.56 kg ai ha^{-1} resulted in 75% control or better of the initial corn stand and resulted in the highest corn grain yields. However, the clethodim label has a 6-d replant interval for corn (Anonymous 2009). Steckel et al. (2009) reported paraquat alone at 0.56 and 0.70 kg ha^{-1}, 0.56 kg ha^{-1} paraquat with simazine at 0.56 kg ha^{-1}, and glufosinate at 0.59 kg ai ha^{-1} resulted in inadequate control, with the resulting yields similar to the untreated check. The yield of the untreated check was approximately 1,000 kg ha^{-1} lower than the highest-yielding treatments, which was consistent with reported yield losses from previous research on uneven corn emergence (Liu et al. 2004; Nafziger et al. 1991).

With earlier corn planting dates, increasing corn hectares, and GR corn adoption, the occurrence of failed corn stands and potential replant situations will likely increase. Also, research assessing the yield impact of replanting corn into a partial stand is limited. Therefore, the objectives of this research were to determine effective herbicide options to control a GR corn stand and to determine the effect of corn replanted into various initial corn stands on grain yield.

Materials and Methods

Effect of Various Herbicides on Control of an Initial GR Corn Stand. This experiment was conducted in 2009 and 2010 at the Ohio State University Western Agricultural Research Station (OSU) near South Charleston, OH, and in 2010 and 2011 at the Throckmorton Purdue Agricultural Center (TPAC) near Lafayette, IN. The soil type at the OSU location was a Kokomo silty clay loam (fine, mixed, superactive, mesic Typic Argiaquolls) with a pH of 6.1 and 2.7% organic matter. The soil type at TPAC was a Toronto-Milbrook silty loam (fine-silty, mixed, superactive, mesic Udollic Endoaqualfs) with a pH of 6.2 and 2.9% organic matter. Soybean was planted in the experimental areas the preceding year for all site-years. The sites were fall chisel-plowed and field-cultivated in the spring and fertilized according to Indiana and Ohio Extension recommendations. Just prior to planting, a premixture of 1.46 kg ai ha^{-1} of *s*-metolachlor, 1.46 kg ha^{-1} of atrazine, and 0.188 kg ai ha^{-1} of mesotrione (Lexar, Syngenta Crop Protection, Inc., Greensboro, NC 27419) was applied at all site-years for weed control followed by POST applications of glyphosate at 0.84 kg ae ha^{-1} as needed.

The experimental design was a randomized complete block design with four replications. Plot size was 3.05 m wide by 9.1 m long at TPAC, and 3.05 m wide by 12.2 m long at OSU. Herbicide treatments and application timings are listed in Table 1. All herbicide treatments were applied with a CO_2-pressurized backpack sprayer calibrated to deliver 140 L ha^{-1} and 187 L ha^{-1} at TPAC and OSU, respectively. Corn was seeded at 80,000 seeds ha^{-1} in 76-cm rows for both plantings at all site-years. GR hybrids were used for the initial planting all site-years. At OSU, 'DKC 61-19' (DeKalb, Monsanto Company, St. Louis, MO 63167) was planted on April 26, 2009, and April 20, 2010. At TPAC, DKC 61-19 was planted on April 20, 2010 and 'DKC 62-54' was planted on May 19, 2011. Corn plants were at V3 to V4 (Abendroth et al. 2011) at the time of herbicide application (Table 1) in all of the site-years. Replants were performed on May 26, 2009, and May 26, 2010, at OSU and on May 23, 2010, and June 8, 2011, at TPAC. For the replanted corn, 'Seed Consultants 11AQ07' (Seed Consultants Inc., Washington Courthouse, OH 43160) and 'Pioneer 33W84' (Pioneer Hi-Bred International, Johnston, IA 50131) hybrids were used at OSU and TPAC, respectively. Both replant hybrids were glyphosate- and glufosinate-resistant. Visual ratings of initial corn stand control were taken at 14 d after treatment (DAT) at OSU and 21 DAT at TPAC on a 0 to 100 scale, with 0 considered no injury and 100 considered plant death. Corn was harvested

Table 1. Herbicide treatments for the effect of various herbicides on control of an initial glyphosate-resistant corn stand experiment at OSU and TPAC.[a]

Herbicide common name	Herbicide trade name	Rate	Timing[a]	Location
		g ai ha^{-1}		
Clethodim	Select Max[b]	70	6 d pre-replant	TPAC + OSU
Glufosinate	Ignite 280[c]	450	At replant	TPAC + OSU
Glufosinate fb glufosinate	Ignite 280	450 fb 450	At replant fb 3 WAT	TPAC + OSU
Paraquat	Gramoxone Inteon[d]	280	At replant	TPAC + OSU
Paraquat	Gramoxone Inteon	700	At replant	TPAC
Paraquat + metribuzin	Gramoxone Inteon + Sencor 75DF[c]	700 + 160	At replant	TPAC + OSU

[a] Abbreviations: OSU, Ohio State University Western Agricultural Research Station; TPAC, Throckmorton Purdue Agricultural Center; 6 d pre-replant, 6 d before the replant; 3 WAT, 3 wk after first herbicide application; fb, followed by.

[b] Valent USA Corporation, Richardson, TX.

[c] Bayer CropScience LP, Research Triangle Park, NC.

[d] Syngenta Crop Protection Inc., Greensboro, NC.

with a plot combine and grain yields were adjusted to 15.5% moisture.

Data were analyzed with the PROC MIXED procedure in SAS 9.2 (SAS Institute, Inc., Cary, NC 27513). Prior to analysis, data were checked for normality and constant variance and no transformations were necessary. Year and replication were considered random effects in the model, and herbicide treatment was considered a fixed effect. Herbicide treatments were different between locations, therefore locations were not combined. Means were separated with Fisher's Protected LSD at the 0.05 level of significance and efficacy data are presented as box-and-whisker plots.

Effect of Replanting Corn into Partial Initial Corn Stands on Grain Yield. The experiment was conducted in Indiana at TPAC in 2010 and 2011 in the same fields with the same field and weed management practices as previously described in the herbicide replant experiment. The experimental design was a randomized complete block six by two factorial with four replications. Factor one was assigned to one of six initial corn plant stands (0, 20,000, 40,000, 60,000, 80,000, and 100,000 plants ha^{-1}) and factor two was either a replant at 80,000 plants ha^{-1} or no replant. Initial corn plant stands were established by planting 0, 20, 40, 60, 80, and 100% blends of a GR corn hybrid, DKC 61-19 in 2010 and DKC 62-54 in 2011, and a non-GR corn hybrid, Pioneer 33W82 both years. The seed blends were planted at 100,000 seeds ha^{-1} and sprayed with glyphosate at 0.84 kg ae ha^{-1} when corn was at the V3 growth stage to achieve the desired initial stands. After at least 6 d, Pioneer 33W84 was replanted at 80,000 seeds ha^{-1} in selected plots. Replanted corn rows were offset from the initial rows by approximately 7 cm. Plot size and planting dates were the same as previously stated for TPAC in the herbicide replant experiment. At the V4 growth stage of the replanted corn, stand counts of both planting dates were performed to verify plant stands. Also at this time, 3-m sections of an initial and replant row were flagged in each plot. One week before harvest, corn ears were hand-harvested from the flagged row section to compare the yield contribution from the initial stand vs. the replant stand. Ear weights were used to determine yield of the hand-harvested corn and were not considered in determining the total plot yield. Corn was harvested with a plot combine and grain yields were adjusted to 15.5% moisture.

Data were analyzed with the PROC MIXED procedure in SAS. Corn plant stand was considered a fixed effect, while year and replication were set as random effects in the model. Data were then fit to a regression line using a polynomial equation to describe the relationship between corn grain yield and initial corn stand with or without a replant. Standard errors are represented as vertical bars.

Results and Discussion

Effect of Various Herbicides on Control of an Initial GR Corn Stand. Control of GR corn was 96% or greater with clethodim (51 g ai ha^{-1}), paraquat (700 g ai ha^{-1}) plus metribuzin (160 g ai ha^{-1}), or glufosinate (450 g ai ha^{-1}) followed by a sequential glufosinate application 3 wk after the initial treatment at both locations. Clethodim exhibited the least amount of variability in GR corn control (Figures 1 and 2) and resulted in the highest yield at both locations (Table 3). However, given the potential grain yield loss of 0.06 to 0.12 Mg ha^{-1} d^{-1} when planting is delayed, it is possible that the grain yield from clethodim treatment may have been lower if replanting had been delayed 6 d after the replanting of the herbicide treatments that allow immediate replanting.

Single applications of glufosinate resulted in highly variable control that ranged from 30 to 75% and 50 to 90% at OSU and TPAC, respectively (Figures 1 and 2). Higher glufosinate rates may have increased control but Steckel et al. (2009) reported glufosinate rates of 590 g ha^{-1} still resulted in ineffective control. Also, a sequential application of glufosinate is not labeled in corn if the 590 g ha^{-1} rate is used as an initial POST treatment. The inconsistent control exhibited with glufosinate was likely the result of variable temperature and relative humidity levels at the time of the herbicide applications (Table 2) and in the following weeks (W. G. Johnson, unpublished data). Previous research has indicated that both low relative humidity and low temperature reduced glufosinate efficacy when compared to high relative humidity and high temperature, respectively (Anderson et al. 1993; Kumaratilake and Preston 2005). The reduction in glufosinate efficacy caused by low temperature was a result of reduced glufosinate translocation (Kumaratilake and Preston 2005). All corn plants were at less than the V6 growth stage when glufosinate was applied, which means that the growing

https://doi.org/10.1614/WT-D-11-00158.1 Published online by Cambridge University Press

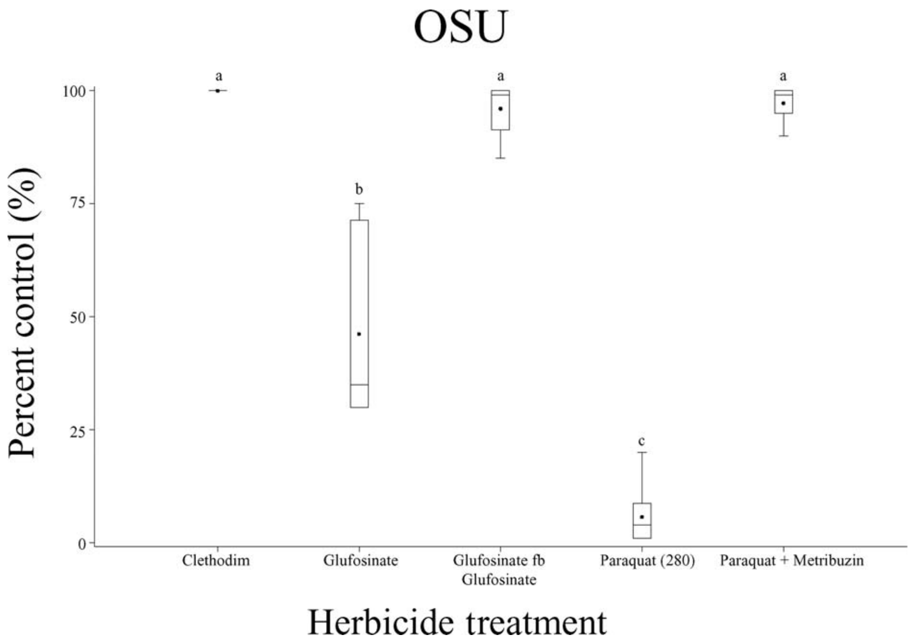

Figure 1. Box-and-whisker plots of percentage of control with various herbicide treatments 3 wk after the last treatment was applied at OSU. Abbreviations: OSU= Ohio State University Western Agricultural Research Station; fb = followed by; 280 = 280 g ai ha^{-1}. Horizontal line in the box denotes the mean value, upper edge (hinge) denotes 75th percentile, lower hinge denotes 25th percentile, vertical lines extend to the highest and lowest values. Means followed by the same letters are not different at P = 0.05.

points were still at or below the soil surface. Therefore, any reduction in translocation caused by an environmental factor likely resulted in reduced control.

A sequential glufosinate application increased control to 96% at both locations (Figures 1 and 2). However, the sequential application of glufosinate only increased grain yield when compared to the single glufosinate application at OSU (Table 3). The lack of a yield response at TPAC to the sequential glufosinate application is either the result of greater control with a single glufosinate application or the result of

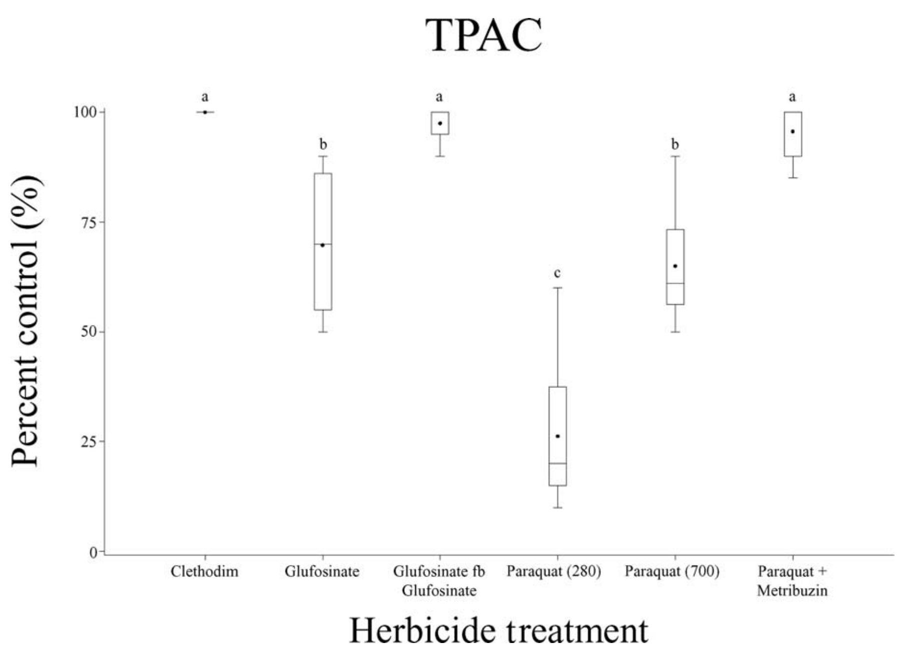

Figure 2. Box-and-whisker plots of percentage of control with various herbicide treatments 3 wk after the last treatment was applied at TPAC. Abbreviations: TPAC = Throckmorton Purdue Agricultural Center; fb = followed by; 280 = 280 g ai ha^{-1}; 700 = 700 g ai ha^{-1}. Horizontal line in the box denotes the mean value, upper edge (hinge) denotes 75th percentile, lower hinge denotes 25th percentile, vertical lines extend to the highest and lowest values. Means followed by the same letters are not different at P = 0.05.

Table 2. Spray application data at OSU[a] in 2009 and 2010 and at TPAC[a] in 2010 and 2011.

	Timing	Temperature	Humidity	Cloud cover	Corn height
		C	%	%	cm
OSU 2009					
May 18	6 d pre[a]	11	45	0	12
May 26	At replant	18	73	100	15
June 15	3 WAT	24	67	15	56
OSU 2010					
May 16	6 d pre	13	73	100	13
May 25	At replant	21	79	40	23
June 17	3 WAT	24	72	0	86
TPAC 2010					
May 14	6 d pre	14	74	40	11
May 25	At replant	22	91	0	18
June 15	3 WAT	26	76	100	70
TPAC 2011					
June 2	6 d pre	18	80	10	10
June 8	At replant	23	84	5	18
June 29	3 WAT	18	80	10	75

[a] Abbreviations: OSU, Ohio State University Western Agricultural Research Station; TPAC, Throckmorton Purdue Agricultural Center; 6 d pre, 6 d before the replant; 3 WAT, 3 wk after first herbicide application.

Table 3. Corn grain yield as affected by herbicide treatment in a corn replant situation in 2009 and 2010 at OSU and 2010 and 2011 at TPAC.

Herbicide	Yield[a] OSU[b]	TPAC[b]
	$Mg\ ha^{-1}$	
Clethodim	15.4 a	11.8 a
Glufosinate	13.8 b	10.9 b
Glufosinate fb glufosinate	14.7 a	11.3 ab
Paraquat (280 g ai ha^{-1})	13.7 b	10.0 c
Paraquat (700 g ai ha^{-1})	n/a[c]	10.2 c
Paraquat + metribuzin	14.7 a	11.6 a

[a] Means within a column followed by the same letter are not significantly different according to an LSD test (P = 0.05).

[b] Abbreviations: OSU, Ohio State University Western Agricultural Research Station; TPAC, Throckmorton Purdue Agricultural Center; fb, followed by; n/a, not applicable.

[c] Paraquat (700 g ai ha^{-1}) treatment was not applied at OSU.

competition from noncontrolled corn plants with the replanted corn that was later controlled by the sequential glufosinate application. Reliance on sequential applications of glufosinate may increase the risk of yield loss from uncontrolled initial plants in a corn replant situation.

Paraquat at 280 g ha^{-1} resulted in less than 40% control regardless of location (Figures 1 and 2). At TPAC, paraquat at 700 g ha^{-1} only provided 65% control whereas the addition of metribuzin improved control to 97% (Figure 2). Steckel et al. (2009) previously reported that tank-mixing a photosystem II inhibiting herbicides (PSII)-inhibiting herbicide with paraquat improved control of GR corn when compared to spraying paraquat alone. The poor control with paraquat alone, irrespective of rate, resulted in reduced grain yields at both locations, whereas the treatment that combined metribuzin with 700 g ha^{-1} of paraquat resulted in grain yields that were not different than the highest grain yields (Table 3). Reliance on paraquat alone to control GR corn without the addition of a PSII-inhibiting herbicide is not effective.

Effect of Replanting Corn into Partial Initial Corn Stands on Grain Yield. Initial corn stands of 60,000, 80,000, and 100,000 plants ha^{-1} without competition from replanted corn produced the highest grain yields, whereas an initial stand of 20,000 plants ha^{-1} without a replant produced the lowest grain yield (Figure 3). A replant of 80,000 plants ha^{-1} into an initial stand of 0 plants ha^{-1} resulted in a grain yield of 11.88 Mg ha^{-1}, which was only 5% less than an initial stand of 80,000 plants ha^{-1} (12.52 Mg ha^{-1}). This 5% reduction in yield is a typical result of delayed planting and is a reason why determining the effect of replanting into an initial stand is critical to maximizing grain yield. Replanting 80,000 plants ha^{-1} into initial corn stand of 40,000 or 60,000 plants ha^{-1} did not affect grain yield when compared to the respective initial corn stand without a replant. In contrast, grain yields were reduced by a replanting into initial stands of 80,000 and 100,000 plants ha^{-1} when compared to the initial stands without a replant (Figure 3). Replanting into an initial stand of 20,000 plants ha^{-1} increased yield from 8.22 Mg ha^{-1} to 10.14 Mg ha^{-1}, but the increased grain yield was still 19% less than the highest yielding treatment (12.52 Mg ha^{-1}).

Further analysis of the yield contribution of the initial stand compared to the replant stand is crucial to understanding the interaction between the two stands. In an initial stand of 20,000 plants ha^{-1} with a replant, the percentage of yield contribution from the initial stand was 60% whereas the replanted corn, which accounted for 80% of the total stand, only produced 40% of the total grain yield (Figure 3). The decline in percentage of yield contribution by replanted corn may explain why replanting when the initial stand is high results in reduced yield (Figure 3). Competition among corn plants because of uneven growth often leads to less yield (Liu et al. 2004; Nafziger et al. 1991). This is why the removal of an initial stand is critical to optimizing replanted corn yield. When replanting into initial stands of 60,000, 80,000, or 100,000 plants ha^{-1}, competition from the initial stand resulted in the lowest grain yield of the replanted corn. In contrast, when replanting into initial stands of 20,000 and 40,000 plants ha^{-1}, competition from the replanted corn resulted in the greatest reduction in yield of the initial stand (Figure 3). These findings not only reiterate the importance of removing an initial stand when a corn replant is conducted but also emphasize the negative impact that overpopulation of corn in a replant situation can have on grain yield. The impact of overpopulation may be overestimated in this study because in many corn replant situations the plants in the initial stand have been damaged by frost, hail, flooding, etc., which has retarded growth making the initial stand less competitive. Nevertheless, removal of the initial stand is recommended because the severity of injury to the initial stand is highly variable and difficult to quickly assess.

Once a grower decides that a corn field is going to be replanted, there are viable options to control the remaining GR corn plants from the initial planting. The most consistent and reliable option to use is clethodim but because of the

https://doi.org/10.1614/WT-D-11-00158.1 Published online by Cambridge University Press

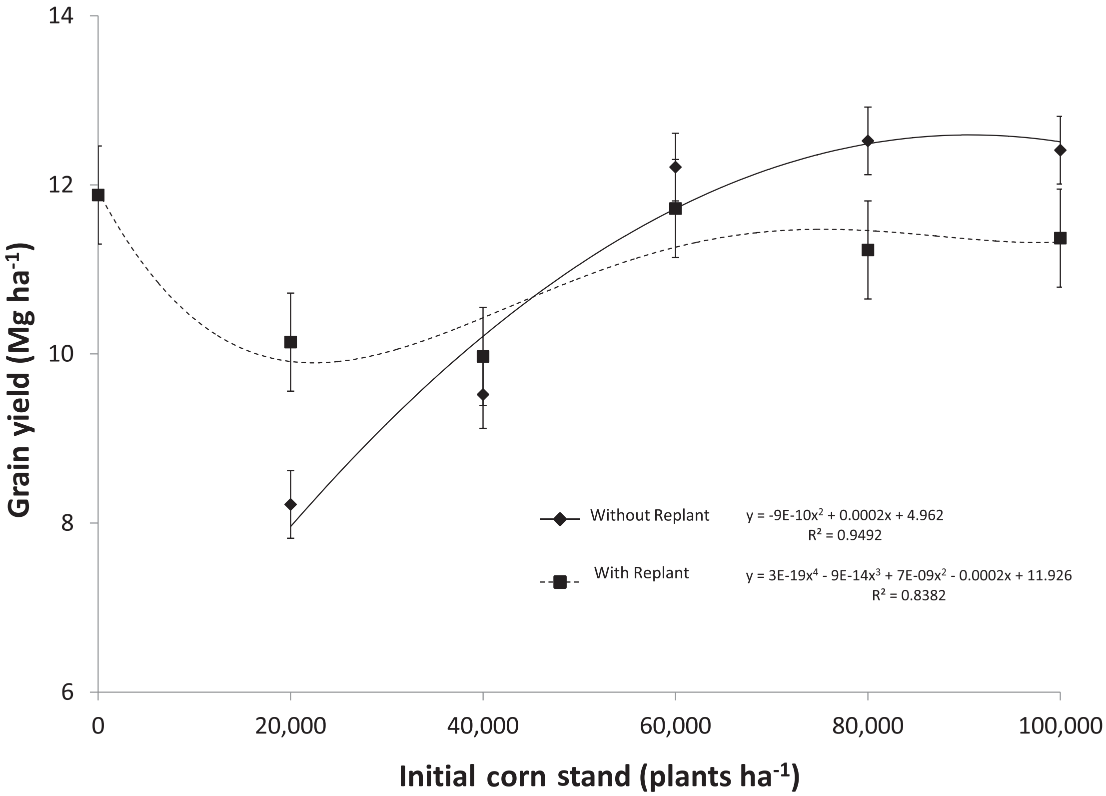

Figure 3. The regression lines for the corn grain yield as affected by an initial corn stand with or without a corn replant at Throckmorton Purdue Agricultural Center in 2010 and 2011. The data were subjected to ANOVA and the means were fitted to a regression using a polynomial equation. The error bars represent the standard error of the means.

6-d planting interval, paraquat plus metribuzin may be the preferred herbicide treatment when time is a concern. Glufosinate, if a sequential application is made, is also an acceptable option. Unfortunately, the increasing prevalence of stacking both glyphosate and glufosinate resistance in hybrids makes glufosinate ineffective in many situations. Regardless of the option used, the removal of an initial population is critical to maximize grain yield in a corn replant situation.

Acknowledgments

The authors would like to thank both the graduate and undergraduate students in the Purdue Integrated Weed Management Lab for their assistance in helping with all phases of this research.

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Received November 9, 2011, and approved April 1, 2012.