Tolerance of Chickpea to Paraquat Applied At-Cracking

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Cook Agronomy Farm in Pullman, WA

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Methods

The study was established at the Cook Agronomy Farm near Pullman, WA. Treatments were applied post emergence (POST) at several different crop stages, detailed in Table 1 and Table 2. The study was conducted in a randomized complete block with 4 replications. Plots were 10' by 30' long. Outlook at 21 fl oz A^{-1} and Loroz at 1.5 lb A^{-1} was applied pre emergence (PRE).

Crop injury was visually rated 9, 17, 36, and 41 days after treatment (DAT) of application A (Table 2). Common lambsquarters control was visually assessed 36 and 41 DAT of application A (Table 3). Plots were harvested using a plot combine on September 20, 2016. All data were subjected to an analysis of variance using the statistical package built into the Agricultural Research Manager software system (ARM 8.5.0, Gylling Data Management).

Results

All treatments had significant control of common lambsquarters compared to the nontreated. There was no observed differences in lambsquarters control within the treatments based on application timing (Table 3).

Approximately 5 to 9 days prior to each paraquat application timing, significant crop injury was present. More serve injury was observed after the later paraquat application timings with greater than 68% injury 9 DAT for plants treated at 7 days after crop-cracking and greater than 59% injury 7 DAT for plants treated at 9 days after crop-cracking (Table 2). Crop injury was no longer present by August 26, 2016 with no significant difference in crop injury compared to the nontreated control. The earlier crop injury did not cause a lasting significant effect to yield. No significant difference in yield observed for any of the treatments (Table 2).

Table 1. *Treatment application details*

Study Application	**A**	**B**	**C**	**D**
Date	May 16, 2016	May 20, 2016	May 24, 2016	May 26, 2016
Application volume (GPA)	15	15	15	15
Crop Stage	At Cracking	4 DA Crack	7 DA Crack	10 DA Crack
Air temperature (˚F)	58	56	54	60
Soil temperature (˚F)	55	55	51	58
Wind velocity (mph, direction)	5, NW	12, NW	5, E	9, S
Next rain occurred on	May 17, 2016	May 20, 2016	June 8, 2016	June 8, 2016

Table 2. *Percent common lambsquarters control in chickpea following applications of paraquat with and without a nonionic surfactant at different application timings. Pullman, WA, 2016. Means followed by the same letter are not statistically significantly different (α=0.05).*

Treatment	Application Code	Rate		*June 21, 2016*	*August 26, 2016*
				Common lambsquarters control	Common lambsquarters control
			lb ai/A	%	%
Nontreated	-	-	-	0 a	0 a
Paraquat (Gramoxone)	A	8 fl oz/A	0.125	67 b	73 b
Paraquat (Gramoxone) **NIS**	A A	8 fl oz/A 0.25 % v/v	0.125	95 b	71 b
Paraquat (Gramoxone)	B	8 fl oz/A	0.125	70 b	71 b
Paraquat (Gramoxone) **NIS**	B B	8 fl oz/A 0.25 % v/v	0.125	64 b	58 b
Paraquat (Gramoxone)	C	8 fl oz/A	0.125	66 b	55 b
Paraquat (Gramoxone) **NIS**	C C	8 fl oz/A 0.25 % v/v	0.125	67 b	55 b
Paraquat (Gramoxone)	D	8 fl oz/A	0.125	68 b	55 b
Paraquat (Gramoxone) **NIS**	D D	8 fl oz/A 0.25 % v/v	0.125	85 b	76 b
Paraquat (Gramoxone)	A	16 fl oz/A	0.250	91 b	81 b
Paraquat (Gramoxone) **NIS**	A A	16 fl oz/A 0.25 % v/v	0.250	86 b	65 b
Sharpen **NIS**	A A	2 fl oz/A 0.25 % v/v	0.045	63 b	61 b

Some of the pesticides discussed in this presentation were tested under an experimental use permit granted by WSDA. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to $7,500. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.

Table 3. *Percent crop injury for chickpea and yield following applications of paraquat with and without a nonionic surfactant at different application timings. Pullman, WA, 2016. Means followed by the same letter are not statistically significantly different (α=0.05).*

Treatment	Application Code	Rate		*May 25, 2016*		*June 2, 2016*		*June 21, 2016*		*August 26, 2016*		*September 20, 2016*
				Crop Injury	*DAT*	Crop Injury	*DAT*	Crop Injury	*DAT*	Crop Injury	*DAT*	Yield
		fl oz/A	lb ai/A	%		%		%		%		lb/A
Nontreated	-	-	-	0 a		0 a		0 a		0		1090
Paraquat	A	8.0	0.125	25 ab	*9*	8 ab	*25*	5 a	*36*	0	*71*	1380
Paraquat NIS	A A	8.0 0.25 % v/v	0.125	14 ab	*9*	0 a	*25*	0 a	*36*	0	*71*	1640
Paraquat	B	8.0	0.125	55 b	*5*	14 ab	*13*	8 ab	*32*	0	*67*	1440
Paraquat NIS	B B	8.0 0.25 % v/v	0.125	45 ab	*5*	31 b	*13*	4 a	*32*	0	*67*	1100
Paraquat	C	8.0	0.125	21 ab	*1*	71 c	*9*	35 ab	*28*	5	*63*	1400
Paraquat NIS	C C	8.0 0.25 % v/v	0.125	5 a	*1*	68 c	*9*	10 ab	*28*	0	*63*	1560
Paraquat	D	8.0	0.125	6 a		59 c	*7*	11 ab	*26*	0	*61*	1430
Paraquat NIS	D D	8.0 0.25 % v/v	0.125	15 ab		73 c	*7*	33 ab	*26*	13	*61*	1720
Paraquat	A	16.0	0.250	48 ab	*9*	14 ab	*25*	3 a	*36*	0	*71*	1510
Paraquat NIS	A A	16.0 0.25 % v/v	0.250	35 ab	*9*	3 a	*25*	3 a	*36*	0	*71*	1250
Sharpen NIS	A A	2.0 0.25 % v/v	0.045	91 c	*9*	56 c	*25*	38 a	*36*	0	*71*	1230