Peanut Response to Co-Application of Pyroxasulfone with Paraquat, Bentazon, and Acephate

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Weed Control is Critical in Peanut

Overlapping residuals has been a component of success

Intensive weed control early in the season is important

Just as expensive and less effective to control weed escapes later in the season

Spraying large Palmer amaranth multiple times with PPO inhibitors later in the season most likely hastens development of resistant populations

Weed Control is Critical in Peanut

Effective PPI and PRE herbicides need to be supported with early POST applications of paraquat plus bentazon with residual herbicides

Acetochlor, dimethenamid-*P*, pyroxazulfone, or *S*-metolachlor/metolachlor are effective residual herbicides applied with paraquat plus bentazon

Which Residual Herbicide is Most Effective?

Still working on that answer in North Carolina

During the development phase we used the company protocol with pyroxasulfone and *S*-metolachlor primarily in a comprehensive program with other herbicides applied PRE and late POST

Currently determining the length of residual control with pyroxasulfone compared to traditional standards

Today we are discussing peanut safety and not weed control

Thrips Control is Critical in Peanut

Effective systemic in-furrow insecticides often need to be supported with early POST applications of acephate

Acetochlor, dimethenamid-*P*, pyroxazulfone, or *S*-metolachlor/metolachlor are effective residual herbicides applied with paraquat plus bentazon, and these combinations are often applied with acephate for thrips and weed control

Current Knowledge of Co-Application for Thrips and Weed Control

Many studies with *S*-metolachlor/metolachlor mixed with paraquat plus bentazon plus acephate

Some work with dimethenamid-*P*, but this herbicide is used less frequently

Information is limited with respect to mixtures of acetochlor or pyroxazulfone mixed with paraquat plus bentazon plus acephate

Materials and Methods

Specific treatments discussed with first data slide

Small-plot research
15 GPA at 30 psi
Nonionic surfactant at 1 pt/100 gal
Applied 3 weeks after planting

Weed-free using PPI/PRE herbicides and POST herbicides 5-6 WAP

Peanut injury 5-6 weeks after planting primarily composed of stunting from herbicides and thrips feeding and pod yield

Peanut injury (%) following application of in-furrow application of phorate, paraquat, bentazon, residual herbicides, and foliar application of acephate[a,b]

Herbicide		POST	In-furrow insecticide	
Contact	**Residual**	**Insecticide**	**No Phorate**	**Phorate**
Paraquat plus bentazon	-	-	43 a	18 cd
Paraquat plus bentazon	-	Acephate	28 b	12 de
Paraquat plus bentazon	Pyroxasulfone	-	37 a	18 cd
Paraquat plus bentazon	Acetochlor	-	40 a	16 d
Paraquat plus bentazon	Pyroxasulfone	Acephate	23 bc	12 de
Paraquat plus bentazon	Acetochlor	Acephate	23 bc	14 de
No herbicide	-	-	28 b	14 de
No herbicide	-	Acephate	17 cd	9 e

[a]Means followed by the same letter are not different according to Fisher's Protected LSD at $p \leq 0.05$. Data are pooled over 4 trials.
[b]Paraquat and bentazon applied at 8 oz/acre. Pyroxasulfone at 2.1 dry oz/acre or 3.3 fluid oz/acre. Acetochlor at 48 fluid oz/acre. Nonionic surfactant at 1 pint/100 gal. applied with all treatments in 15 GPA.

Peanut yield (lbs/acre) following application of in-furrow application of phorate, paraquat, bentazon, residual herbicides, and foliar application of acephate[a,b]

Herbicide		POST insecticide	In-furrow insecticide	
Contact	Residual		No Phorate	Phorate
Paraquat plus bentazon	-	-	4100 e	4600 a-d
Paraquat plus bentazon	-	Acephate	4070 e	4400 b-e
Paraquat plus bentazon	Pyroxasulfone	-	4270 de	4710 abc
Paraquat plus bentazon	Acetochlor	-	4100 e	4380 b-d
Paraquat plus bentazon	Pyroxasulfone	Acephate	4400 b-e	4660 abc
Paraquat plus bentazon	Acetochlor	Acephate	4360 cde	4820 a
No herbicide	-	-	4400 b-e	4270 e
No herbicide	-	Acephate	4220 e	4610 a-d

[a]Means followed by the same letter are not different according to Fisher's Protected LSD at $p \leq 0.05$. Data are pooled over 4 trials.

[b]Paraquat and bentazon applied at 8 oz/acre. Pyroxasulfone at 2.1 dry oz/acre or 3.3 fluid oz/acre. Acetochlor at 48 fluid oz/acre. Nonionic surfactant at 1 pint/100 gal. applied with all treatments in 15 GPA.

Herbicides only

Peanut injury (%) following application of paraquat, bentazon, and residual herbicides[a]

Herbicides		Rate (oz/acre)	Visual injury (%)		
Contact	**Residual**		**1 WAT**	**2 WAT**	**3 WAT**
Paraquat plus bentazon	-	8 + 8	20 a	8 a	5 b
Paraquat plus bentazon	Pyroxasulfone	8 + 8 + 2.5	25 a	17 a	20 ab
Paraquat plus bentazon	Dimethenamid-*P*	8 + 8 + 12	27 a	12 a	25 ab
Paraquat plus bentazon	Acetochlor	8 + 8 + 40	25 a	20 a	20 ab
Paraquat plus bentazon	*S*-metolachlor	8 + 8 + 16	25 a	28 a	40 a
Paraquat plus bentazon	Pyroxasulfone	8 + 8 + 3.3	28 a	13 a	24 ab
Paraquat plus bentazon	Dimethenamid-*P*	8 + 8 + 16	38 a	25 a	33 ab
Paraquat plus bentazon	Acetochlor	8 + 8 + 54	25 a	13 a	15 ab
Paraquat plus bentazon	*S*-metolachlor	8 + 8 + 21	38 a	30 a	37 ab

[a]Means followed by the same letter are not different according to Fisher's Protected LSD at $p \leq 0.05$. Data are from 1 trial. Nonionic surfactant at 1 pint/100 gal. applied with all treatments in 15 GPA. Pendimethalin plus flumioxazin PRE.

Peanut injury (%) following application of paraquat, bentazon, and residual herbicides[a]

Herbicides		Rate (oz/acre)	Visual injury (%)		
Contact	**Residual**		**1 WAT**	**2 WAT**	**3 WAT**
Paraquat plus bentazon	-	8 + 8	15 c	9 b	16 a
Paraquat plus bentazon	Pyroxasulfone	8 + 8 + 2.5	31 b	21 ab	14 a
Paraquat plus bentazon	Dimethenamid-*P*	8 + 8 + 12	18 c	13 b	14 a
Paraquat plus bentazon	Acetochlor	8 + 8 + 40	41 a	30 a	23 a
Paraquat plus bentazon	*S*-metolachlor	8 + 8 + 16	24 bc	14 b	26 a

[a]Means followed by the same letter are not different according to Fisher's Protected LSD at $p \leq 0.05$. Data are from 1 trial. Nonionic surfactant at 1 pint/100 gal. applied with all treatments in 15 GPA. Pendimethalin plus flumioxazin PRE.

One Day after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus pyroxasulfone

One Day after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus dimethenamid-*P*

One Day after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus acetochlor

One Day after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus *S*-metolachlor

Two Weeks after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus pyroxasulfone

Two Weeks after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus dimethenamid-*P*

Two Weeks after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus acetochlor

Two Weeks after Treatment

Paraquat plus bentazon

Paraquat plus bentazon plus *S*-metolachlor

Summary and Questions?