# Forage Termination

The Risk of Seeding Wheat versus Canola

Mike Hall Research Coordinator Yorkton



East Central Research Foundation

Parkland

COLLEGE

Western Canada Recommendations

#### • Tillage (five to seven passes)

- Soil erosion, degradation (om, soil structure), loss of soil moisture, time consuming, fuel and equipment costs
- Abundant stones or uneven topography many favour herbicide use over tillage. Tillage might be needed to even out mole hills.
- Not effective on alfalfa, smooth brome, quackgrass and Canada thistle
- Losing a year of production
- Tillage and Herbicides
  - Substituting herbicide for tillage
  - Herbicide Timing
    - In summer or fall of the year prior to seeding
    - Prior to working stand in spring "When applying herbicides in early spring, control of perennial forages will be reduced as this is not the ideal stage for maximum effectiveness."

Western Canada Recommendations

- Herbicides (glyphosate)
  - Direct seed into undisturbed sod
    - Maintains soil aggregation, Moisture conservation and reduced soil erosion
    - Requires a disk or narrow knife seeding tool
  - Timing
    - In summer (July to September)
      - preharvest or regrowth (0.67 1.33 l/ac Transorb)
      - Potential for incomplete kill. If preharvest is applied to first cut hay, then a preseeding application will more likely be warranted later in the growing season or following spring
      - Mellow seed bed, more time for sod to decompose, less phytotoxicity, less soil borne disease
      - Soil nitrogen and moisture levels have more time to build up
    - In fall (Late August to September)
      - preharvest or regrowth (0.67 1.33 l/ac Transorb)
      - Potential of a second (or third) hay cut in final year
      - Best results in early September on hay not cut since mid July, however, dry fall conditions could reduce control (brown soil zones)
      - Air temperatures below 15°C may reduce glyphosate efficacy at rates below 0.67 l/ac

Western Canada Recommendations

- Herbicides (glyphosate)
  - Timing
    - In spring
      - must delay seeding (2-3 weeks) to wait for regrowth (3-4 leaf stage) before spraying (0.67 – 1.33 l/ac Transorb)
      - May not work as well
      - Uses up spring moisture
      - Later release of nitrogen from terminated stand
      - Seed bed not as mellow

Sask Ag. Recommendation

#### **Crop Selection**

- Sod seeding with cereal crops (eg. wheat, barley and oats) provide more consistent results than with small seeded crops such as canola.
- The larger seed size of cereals allows seeds to be placed beneath the thatch layer into soil where good soil to seed contact occurs.
- If seeding late a silage or green feed crop might be a better option
- Root rot and other soil-borne diseases with a heavy sod may affect barley, wheat and peas

### Treatments for RR canola and wheat\*

#	Timing	Rate (L/ac Transorb)				
1	Preharvest – Aug 8, 2014	0.66 – Direct seeded May 25, 2015				
2	Early Spring – May 19, 2015	1.33– Direct seeded May 25, 2015				
3	Early Spring – May 19, 2015	0.66– Direct seeded May 25, 2015				
4	Early Spring – May 19, 2015	1.33- Cultivated then seeded May 25, 2015				
*2 0						

\*2-RCBD's with 4 replicates; plot size 35 by 50 feet

#	Timing	Rate (L/ac Transorb)	
1	Preharvest – Aug 8, 2014	0.66 – Direct seeded May 25, 2015	MARCHINE THE AND
1			
R.S.			

Harvested Sept 14, 2014 Picture Sept 23, 2014

#	Timing	Rate (L/ac Transorb)	
1	Preharvest – Aug 8, 2014	0.66 – Direct seeded May 25, 2015	
	The second		
	R College		
	Zels"		
	E A A		
	A ge	JAN NA	
			May 26, 2015

#	Timing	Rate (L/ac Transorb)	
2	Early Spring – May 19, 2015	1.33– Direct seeded May 25, 2015	
3	Early Spring – May 19, 2015	0.66– Direct seeded May 25, 2015	
		で行く会社で	
	K ALT		
		法的任何	
	112		
		行法的政治	
	- ATTACK	Contract of the second	May 26, 2015

#	Timing	Rate (L/ac Transorb)	
4	Early Spring – May 19, 2015	1.33- Cultivated then seeded May 25, 2015	
		國人得用計	
	2/12	初祖祖	
		11 Alexandre	
		行行社会	
		人家家族	
			May 26, 2015

#### Accumulated Rainfall (mm) Yorkton



# Variable timing of emergence



#	Timing	Rate (L/ac Transorb)
1	Preharvest – Aug 8, 2014	0.66 – Direct seeded May 25, 2015







#	Timing	Rate (L/ac Transorb)
4	Early Spring – May 19, 2015	1.33- Cultivated then seeded May 25, 2015



# June 3, 2015 # Tin

#	Timing	Rate (L/ac Transorb)
1	Preharvest – Aug 8, 2014	0.66 – Direct seeded May 25, 2015

# #TimingRate (L/ac Transorb)2Early Spring –<br/>May 19, 20151.33 – Direct seeded May<br/>25, 20153Early Spring –<br/>May 19, 20150.66 – Direct seeded May<br/>25, 2015

June 3, 2015

#	Timing	Rate (L/ac Transorb)		
4	Early Spring – May 19, 2015	1.33- Cultivated then seeded May 25, 2015		

June 3, 2015

#### Treat 2. Spring glyphosate 1.33 L/ac (Transorb)



Seeded May 25

#### June 18, 2015



Treat 1. Preharvest glyphosate 0.66 L/ac (Transorb)



Seeded May 25 June 18, 2015



Treat 4. Preharvest glyphosate 1.33 L/ac (Transorb); Cultivate



Seeded May 25 June 18, 2015

Treat #	Wheat Yield (bu/ac)			Contraction of the	Treat #	Canola Yield (bu/ac)
1	7.1 c	20.88			1	47.8 a
2	29.4 a	and the second			2	33.9 c
3	28.3 a		CM STORAGE	The second se	3	36.4 c
4	17.8 b	1	1. 80 TV 1	11 Constanting of the second state	4	43 b
Harves	t Oct 15				Ha	rvest Oct 11
		#	Timing	Rate (L/ac Transorb)		
		1	Preharvest – Aug 8, 2014	0.66 – Direct seeded May 25, 2015	Sept	2,2015

Treat #	Wheat Yield (bu/ac)				Treat #	Canola Yield (bu/ac)
1	7.1 c				1	47.8 a
2	29.4 a				2	33.9 с
3	28.3 a	and a linear		A LA LA A LA	3	36.4 c
4	17.8 b				4	43 b
Harves	t Oct 15				Ha	arvest Oct 11
		#	Timing	Rate (L/ac Transorb)		
		2	Early Spring – May 19, 2015	1.33– Direct seeded May 25, 2015	Sept	2, 2015

Treat #	Wheat Yield (bu/ac)			Treat #	Canola Yield (bu/ac)
1	7.1 c	a manifest Million and		1	47.8 a
2	29.4 a	A STATE OF THE STATE OF	In Station and and and Million and	2	33.9 c
3	28.3 a	TOPERAL ALTON		3	36.4 c
4	17.8 b		(M)	4	43 b
Harve	st Oct 15			Ha	rvest Oct 11
		# Timing	Rate (L/ac Transorb)		
		3 Early Spring – May 19, 2015	0.66– Direct seeded May 25, 2015	Sept	2, 2015

Treat #	Wheat Yield (bu/ac)			Treat #	Canola Yield (bu/ac)
1	7.1 c	Walking and Milli	White the second state of the second	1	47.8 a
2	29.4 a			2	33.9 c
3	28.3 a	a description	States and the second second	3	36.4 c
4	17.8 b	A STANDARD	N. R. Martin and A. S.	4	43 b
Harves	t Oct 15			Ha	rvest Oct 11
		# Timing	Rate (L/ac Transorb)		
		4 Early Spring – May 19, 2015	1.33- Cultivated then seeded May 25, 2015	Sept	2, 2015

#### **Crop Heat Units Yorkton**



# Summary and Conclusions

- Preharvest glyphosate (0.66 l/ac Transorb on Aug 8) produced the greatest canola yields
  - More soil moisture reserves
  - In crop glyphosate could control regrowth of Smooth brome
- Preharvest glyphosate (0.66 l/ac Transorb on Aug 8) produced the lowest wheat yields
  - Smooth brome emerged after seeding and couldn't be controlled in-crop
  - The incomplete control may have resulted from:
    - A mid date preharvest application
    - Relatively low glyphosate rate
- Spring glyphosate (0.66 or 1.33 l/ac Transorb on May 19) provided decent yields of canola and wheat
  - Emergence was very late (dry soil) thus maturity was late for both wheat and Canola. Narf had a similar situation but only the emergence of the canola was affected which reduced yield.
  - Other trials have found this timing can result in reduced control. Adequate forage regrowth in spring is crucial.
- Spring cultivation improved crop emergence with spring glyphosate
  - Improved canola yield relative to spring glyphosate treatments
    - Early emergence
  - Decreased wheat yield relative to spring glyphosate treatments
    - Early emergence too but maybe wheat less able to compensate for early drought or ?

# Summary and Conclusions

#### If it were me?

- Spray out in the summer or fall before seeding
  - Avoid early august timing, early sept probably better
- Seed RR Canola
- If soil conditions real dry consider a cereal for grain or green feed

# THE END

#### Direct Seeding of Annual Crops into Sod-NARF

Сгор	Spray timing	Seeding method	Yield (bu/ac)
Canola	Spring only	Disc	16
Canola	Spring only	Knife	22
Canola	Fall and Spring	Disc	15
Canola	Fall and Spring	Knife	24
Wheat	Spring only	Disc	42
Wheat	Spring only	Knife	39
Wheat	Fall and Spring	Disc	46
Wheat	Fall and Spring	Knife	53

- Fall weather max 2 l/ac
- Spring weather max 2 L/ac May 18 (very little green-up of the fall sprayed sod prior to seeding)
- Visually weed control better with fall and spring
- Knife opener better than the disc
- Canola seeded May 30
- Fertility looks goofy sulphur wasn't applied on the canola until july 26 as a broadcast
- They had a dry spring also
- Canola emergence delayed and yields poor. Seeded shallower into dry soil than the wheat

	#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
	1	Preharvest –	0.66 – Direct seeded May		1	47.8	9.6
		Aug 8, 2014	25, 2015		2	33.9	11.1
-	-		Contraction of the second s	CONTRACTOR OF THE OWNER	3	36.4	11
1 2 20				AND AND A DAMAGE AND A DAMAG	4	43	8
in the						Harve	st Oct 11
上の記			and the second second	他的主义			
A PATE OF A PA			A STATISTICAL CONTRACTOR				
たんといい	a a		and have the second				经长
					1510	11-77 M	NO ST
		24 和教堂社会	AN AMARINA CONTRACT	行影响和不	Sold State		
144					North P		Nº44
にんど	不			《合社会》	A. W	U. P. Day	- a yuntil
300		US BEAS		Ster Ville	W/A		
			CHER CONTRACTOR			Sector a	the state
Section 2		WAR V	AN ANALAS			Sent 2	2015
100	A.X	A CLERICAN STAN	TE ENRICE NUMBER	and the state	14.180		

1	#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
	2	Early Spring –	1.33– Direct seeded May		1	47.8	9.6
	STON	May 9, 2015	25, 2015	datte Million	2	33.9	11.1
			A REAL PROPERTY AND A REAL	A LOUGH AND A REAL PROPERTY OF	3	36.4	11
-		Contraction of the other			4	43	8
	-			A set the set		Harve	st Oct 11
		- Marka Same			teres a		
		ANGELIC		通知是是			
	M.			A CONTRACT	See.	新 <u>人</u> 了档案。	家服。
						NE ALS	S. A. C.
							NACE /
1		The setting				Here we	VRIGH
		EN MAN			A.		THE STREET
		XVVR		A Part			Elle Fail
とあ		H Stender					12 The
Ķ			2 STALES I	VAL KIN	SS2 hree	WE TU	
A		THE SE	AND AND AND	A VESUA	W.	Sept 2	2015

#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
3	Early Spring –	0.66– Direct seeded May		1	47.8	9.6
	May 9, 2015	25, 2015		2	33.9	11.1
	a magnetic de la construir de l	Manufacture and the second secon		3	36.4	11
	THE REAL PROPERTY.		Anna an Adressa	4	43	8
				And Callson	Harve	st Oct 11
	S. A. Arranda	A State of the Sta				
		ALC: A PARTY				
			- <del>12</del> 74.34		ALC: NO	
				1000		
	大国家的				and the set	an a
			<b>信</b> 约	El4. Ø	必要合同	
N.		A CALLER AND A CAL				使利利
		E A A A A A			Malle -	
		HAN BONDER ST			WASHA	Kan V
	- Alexandre		VIS TO			
	A CAR	and the second s			Sept 2,	2015

	#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
2	4	Early Spring –	1.33- Cultivated then		1	47.8	9.6
		May 9, 2015	seeded May 25, 2015	a september and a backweet states -	2	33.9	11.1
語の	ALL MARKED	an and the second s	and the second	a dire sound and	3	36.4	11
		A STREET		Carl Strategy of	4	43	8
	の一般に見ていた。					Harve	st Oct 11
	がたい					Sept 2,	2015

	#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
20 2	1	Preharvest –	0.66 – Direct seeded May	Websie untertraction	1	7.1	18.5
11-3 	(v. 21	Aug 8, 2014	25, 2015	and the second sec	2	29.4	21.9
		A REAL PROPERTY.	a summer and a set of the second second		3	28.3	20.4
-		· · ··································	CAR THE WAR AND AND	可以科加	4	17.8	17.6
1				的复数补偿		Harve	st Oct 15
「おくれ		、深水和信号	的论当心。这些你们不是				物。而這
である		Carling Land			Aller's		
			地区和新闻和新闻			Rest Mark	
and and and	AV.		《表文》《《书》(《字》)			外们的	CLIMAN
						A PARA A	CARS!
		依不已经多	WAR AND	<b>须的 </b> 沿為	KART.	ANNA	TO ALT
		Con Asta			X4X	F. A.M.	
and the second s	à,					ALL PA	
		CALMONT A	A CHARACTER AS AN	MARCANA S		Sept 2,	2015

	#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
	2	Early Spring –	1.33– Direct seeded May		1	7.1	18.5
7	L Broke	May 9, 2015	25, 2015		2	29.4	21.9
a line	-	Carlo - Carlo - Carlo		and the second se	3	28.3	20.4
	1	A FEE ST			4	17.8	17.6
			The state of the state of the state of the			Harve	st Oct 15
		C. STATES			N. The	Varia (	IN STATE AS
		St. Part Walt	A LANDARY CONTRACTOR	CAN ANT		口不可能	16. 491
		100351 101 01					W TAN
なるのない			<b>常在这些外国的主义的</b> 。		加加加	STAN AN	1234
A STATE OF						New York	
the second		MAC ANY A		T MAN Fact	和時代	<b>FRANCE</b> 18	
N. Cast			AR THE REAL IN 1888		國內為		
and the second	U.			13%社团性	影响得	期於日本	LAR
		A VARIAN AS	ANY STATISTICS		Wall M		CHART?
and the second			ANT A MAN AND AND AND AND AND AND AND AND AND A			No and a state	要出版
		(加)和代			W W	Sent 2	2015
N N		A STARLE WIRE DE WI		<b>同时的"卫星"的</b> 科学	利益民族的	<b>FARAX</b>	

	#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
10.01	3	Early Spring –	0.66– Direct seeded May	allandara anadara	1	7.1	18.5
	10000	May 9, 2015	25, 2015		2	29.4	21.9
				and the state	3	28.3	20.4
No la Ac					4	17.8	17.6
						Harve	st Oct 15
				<b>WAR</b>			
							的名
				的版			#約
		R. M. Martin				Sept 2,	2015

	#	Timing	Rate (L/ac Transorb)		Treat #	Yield (bu/ac)	% moisture
	4	Early Spring –	1.33- Cultivated then	A STANDARD COMPANY	1	7.1	18.5
		May 9, 2015	seeded May 25, 2015		2	29.4	21.9
			Contraction of the second		3	28.3	20.4
			Constanting and the second for		4	17.8	17.6
		eggan (dec.)				Harve	st Oct 15
			A THE MARKEN AND THE A	派公开的		而高致之。	The Second
		Na Citta	AND THE PARTY A	物物的	rain.	1940 (March)	的社会是
				<b>《《</b> 》《《》	N/ NA	一种动物	
		PWK ALA V			制在方面	们认为洲	
	職						1 Walter
		深圳县 山田	的方面和几乎非常的				习得他
		E. STAL	Samer Charles in				
+		德鲁西 四				後的加加	
		TW AND		NA IN		和恐怖感感	12 9 1
				1994 News	R-24	REAL PROPERTY	al Bass
NA THE				TAL ISA		Sept 2,	2015

Operation	Date
Preharvest glyphosate (Transorb 666 ml/ac) sprayed on trt 1 (both	August 8, 2014
trials)	
Forage cut from all treatments (both trials)	Sept 14, 2014
Glyphosate sprayed on treatments 2, 3 and 4 (both trials)	May 19, 2015
Cultivated treatment 4 (both trials)	May 23, 2015
Harrowed treatment 4 (both trials)	May 25, 2015
Seeded Canola and Wheat trials	May 25, 2015
Canola in trt 1 sprayed in-crop with glyphosate (400 ml/ac Transorb)	June 10, 2015
Wheat in trt 1 sprayed in-crop with Puma + Prestige	June 11, 2015
Canola in trt 1-4 sprayed in crop with 333 ml/ac Transorb	June 18, 2015
Wheat in trt 1 sprayed with simplicity; Wheat in trt 2-4 sprayed with	June 25, 2015
simplicity + curtail M	
Preharvest (666 ml/ac Transorb)	Oct. 1, 2015
Harvested Canola Trial	Oct 11, 2015
Harvested Wheat Trial	Oct 15, 2015









Treat 2. Spring glyphosate 1.33 L/ac (Transorb)



#### Seeded May 25

#### June 18, 2015

#### Treat 1. Preharvest glyphosate 0.66 L/ac (Transorb)



Seeded May 25



Seeded May 25

#### Forage Termination Strategies on Succeeding Annual Crops Wheatlands Conservation Association

- 1. Forage (terminated by Full Tillage) pea Wheat
- 2. Forage (terminated by Full Tillage) oat Wheat
- 3. Forage (terminated by Full Tillage) canola Wheat
- 4. Forage (terminated by Full Tillage) wheat Wheat
- 5. Forage (terminated by Full Tillage) Full Tillage fallow-Wheat
- 6. Forage (terminated by Chemical Tillage) pea Wheat
- 7. Forage (terminated by Chemical Tillage) oat Wheat
- 8. Forage (terminated by Chemical Tillage) canola Wheat
- 9. Forage (terminated by Chemical Tillage) wheat Wheat
- 10. Forage (terminated by Chemical Tillage) Chemical fallow-Wheat
- 11. Forage (terminated by Min Tillage) pea Wheat
- 12. Forage (terminated by Min Tillage) oat Wheat
- 13. Forage (terminated by Min Tillage) canola Wheat
- 14. Forage (terminated by Min Tillage) wheat Wheat
- 15. Forage (terminated by Min Tillage) Min Tillage fallow-Wheat

# Full Tillage System

#### <u>In 2013</u>

- May 2 Tandem disked (3 times)
- May 27 Seeded annual crop (80N cereals, 100N canola 50P peas)
- Aug 8 Tandems disked (additional demo plot)
- Harvest

<u>In 2014</u>

- June 2 Tandem disked
- June 5 Seeded Unity 70N 35P 0K 14S side banded
- June 24 Sprayed in-crop with Horizon and Thumper

# Min Tillage System

#### <u>In 2013</u>

- May 2 Tandem disked (1 times)
- May 7 Roundup Transorb @ 1 l/ac
- May 21 Roundup Transorb @ 1 l/ac
- May 27 Seeded annual crop (80N cereals, 100N canola 50P peas)
- Harvest

#### <u>In 2014</u>

- June 2 Roundup Transorb @ 1 l/ac
- June 2 Tandem disked
- June 5 Seeded Unity 70N 35P 0K 14S side banded
- June 24 Sprayed in-crop with Horizon and Thumper

# Chemical Termination system

#### <u>In 2013</u>

- May 7 Roundup Transorb @ 1 l/ac
- May 21 Roundup Transorb @ 1 l/ac
- May 27 Seeded annual crop (80N cereals, 100N canola 50P peas)
- Aug 8 Roundup Transorb @ 1l/ca + Heat (additional demo plot)
- Harvest

<u>In 2014</u>

- June 2 Roundup Transorb @ 1 l/ac
- June 5 Seeded Unity 70N 35P 0K 14S side banded
- June 24 Sprayed in-crop with Horizon and Thumper



#### 2014 Wheat Yields Following Forage Termination



•Wheat yields were best following forage termination in the year prior to seeding an annual crop, despite the method of termination.

•Crops grown in the same year of forage termination suffered from poor seedbed preparation and abundant forage re-growth despite in-crop herbicides competing with the crop in 2013, which carried over into 2014.

•Abundant rainfall in 2014 eliminated the negative affects of tillage.