

SOD-SEEDING FOR PASTURE REJUVENATION: A REVIEW

PAUL JEFFERSON, TERRY KOWALCHUK¹ AND DALE WOTHERSPOON²

1 SASKATCHEWAN MINISTRY OF AGRICULTURE, 2 SASKATCHEWAN CROP INSURANCE CORP.

Soils and Crops Workshop March 5 2019



BACKGROUND

- 5 million acres of seeded pasture in SK
- 80-90% of beef animal's diet is forage
- Very long stand life despite species shifts and productivity decline
- If traditional “break (till) and reseed” is not attractive, why not sod-seeding

SOD-SEEDING: SEEDING DESIRABLE FORAGE SPECIES INTO EXISTING STAND WITHOUT TILLAGE



- Faster & cheaper than break and re-seed options
- Used in other agro-ecological regions
- Why has uptake lagged in SK?

PAST RESEARCH



- 1980's and 90's
- Waddington, Bowes, Schellenberg and others
- Equipment, species, herbicide, sites
- Extension info and demo's

Reference	Location	Soil Zone	Existing vegetation	Seeded species
Bowes & Zentner 1992 Bowes 1976, 1977	Kelliher	Grey	bluegrass	Alfalfa & grass
	Regina	Dark Brown	bromegrass	Alfalfa, sainfoin
Bowes 1995 Bowes 1997b (in Waddington 2017)	Hyde	Black	grass	Alfalfa
	Hafford	Grey	bromegrass	Birdsfoot trefoil, Cicer milkve (CMV), meadow brome, Purp. Prairie clover (PPC), native grasses
Jefferson et al 2014	Shell Lake	Grey	bromegrass	Birdsfoot trefoil, CMV, meadow brome, PPC, native grasses
	Lanigan	Black	crested wheatgrass	Alfalfa
Jefferson unpublished	Lanigan	Black	crested wheatgrass	Alfalfa
Khatiwada, B. 2018	Lethbridge	irrigation	alfalfa	sainfoin & CMV
	Ponoka	Black	brome	sainfoin & CMV
MAFRI 2006	Red Deer	Black	orchardgrass	sainfoin & CMV
	Gladstone	Black	grass	Alfalfa
Malik&Waddington 1990	Portage	Black	grass	Alfalfa
	Pathlow	Grey	grass	Alfalfa, CMV
Peat and Bowes 1995	Neudorf	Black	crested wheatgrass	Alfalfa
	Swift	Brown	crested wheatgrass	Alfalfa
Schellenberg & Waddington 1997	Current	Grey	bromegrass	Alfalfa, CMV
	St Walberg	Brown	crested wheatgrass	Alfalfa, sweet clover
Schellenberg et al 1998	Swift	Brown	Russian wildrye	Alfalfa, sweet clover
	Current	Brown	Crested wheatgrass	Alfalfa
Schellenberg et al. 1994a	Swift	Brown	Russian wildrye	Alfalfa
	Current	Brown	Crested wheatgrass	Alfalfa
Schellenberg et al. 1994b	Swift	Brown	Russian wildrye	Alfalfa
	Current	Brown	wheatgrass	Alfalfa
Waddington and Bowren 1976	Pathlow	Black	grass	Alfalfa & grass
Waddington 1992	Crane Valley	Brown	grass	Alfalfa
	Indian Head	Black	grass	Alfalfa
	Lanigan	Black	grass	Alfalfa
	Pathlow	Grey	grass	Alfalfa
	Scott	Dark Brown	grass	Alfalfa
	Swift	Brown	grass	Alfalfa
	Current	Brown	grass	Alfalfa
	Webb	Brown	grass	Alfalfa

VEGETATION CONTROL

- Does vegetation control improve sod-seeded seedling establishment? Yes.
- Does herbicide vegetation control reduce forage yield in sod-seeding season? Yes
- Can other methods of vegetation control be used successfully? Maybe
- Tillage promotes weeds eg. Dandelions at Pathlow
- Heavy grazing?

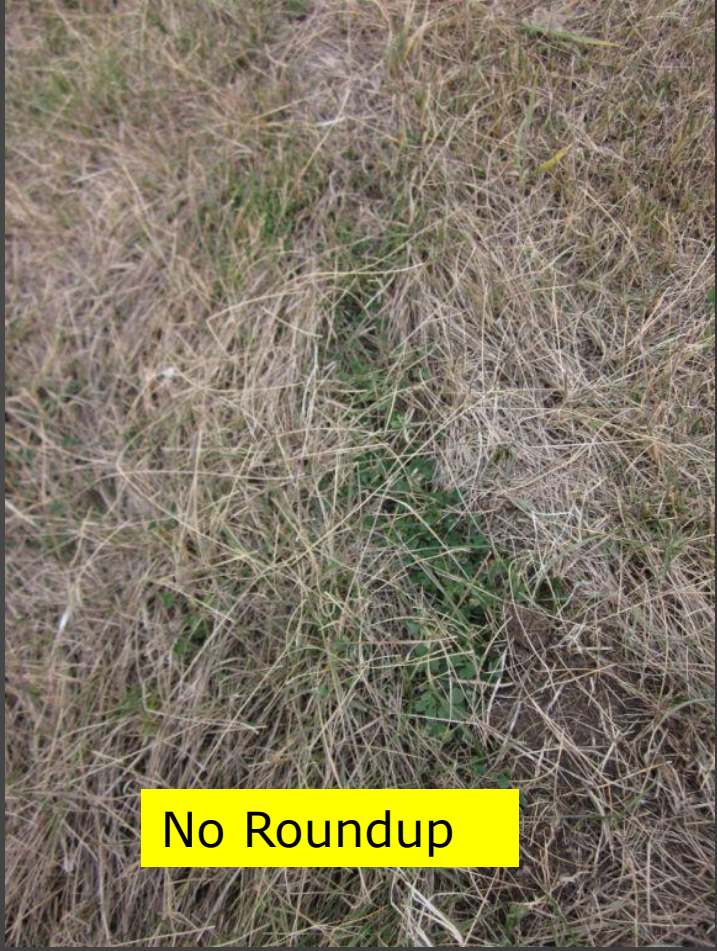
RESULTS

Main plot	Seedlings per m row	DM forage yield kg ha ⁻¹	% alfalfa
Glyphosate	52	3036	42
No herbicide	22	2358	1





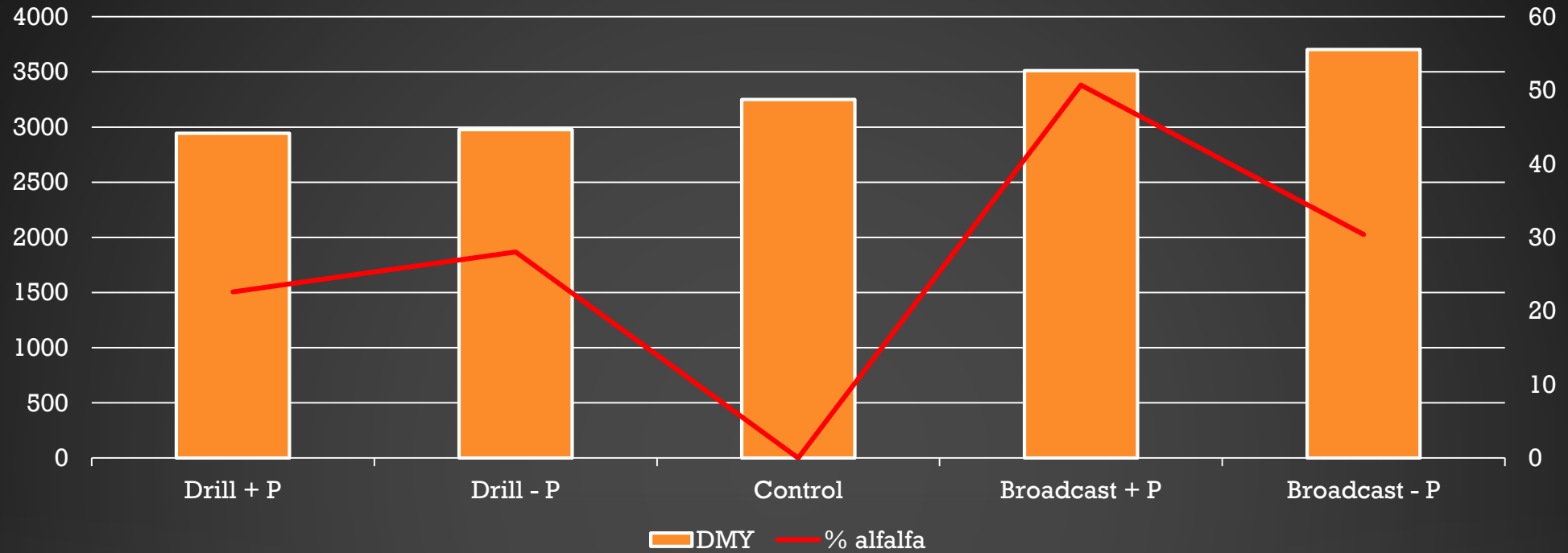
Roundup



No Roundup

Photos: Kathy Larson

SOD-SEEDING AFTER GRAZING



2 years later!

LEGUME SPECIES EFFECT ON SOD-SEEDED LEGUME COUNTS AND FORAGE DM YIELD AFTER SOD-SEEDING.

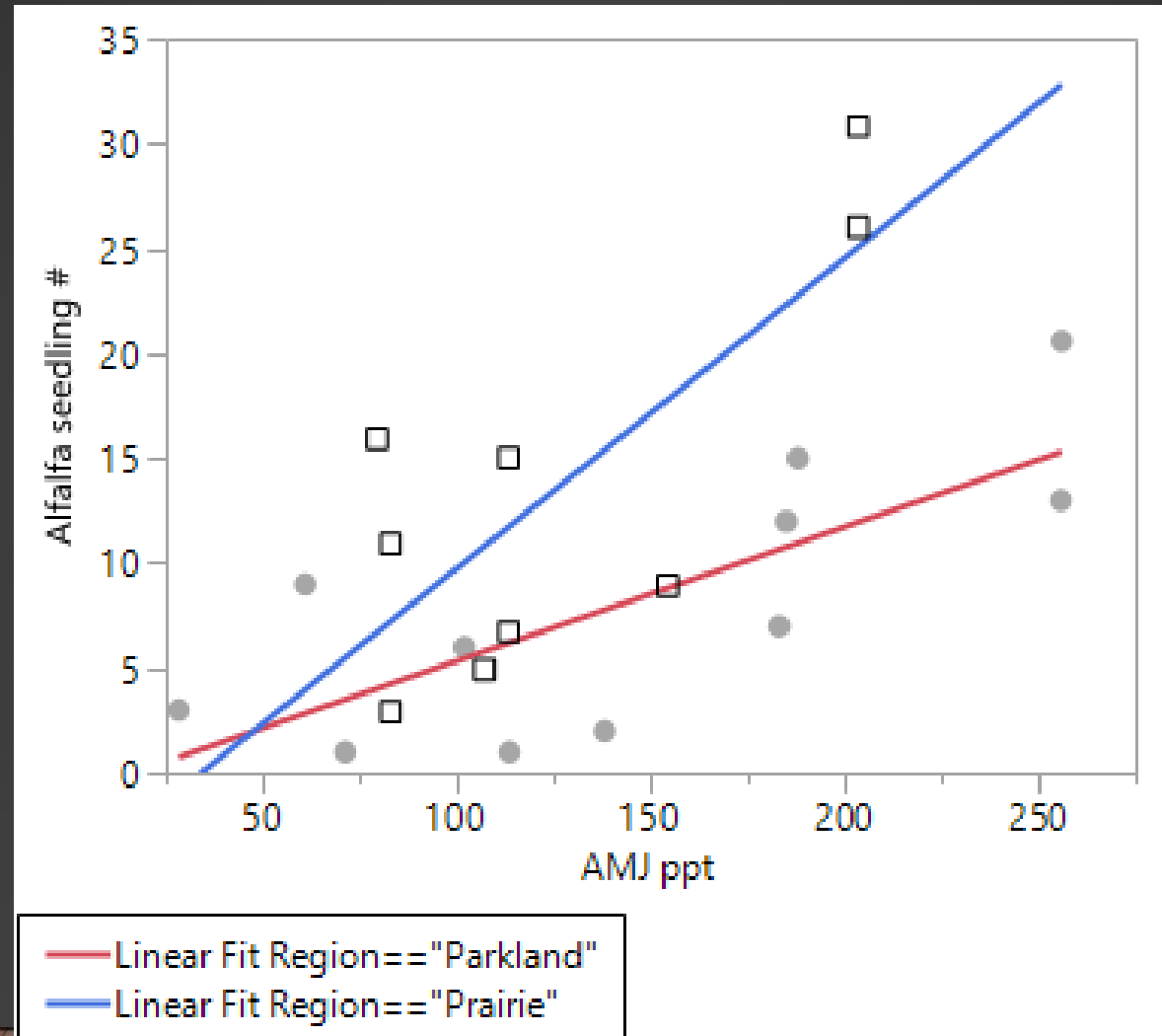
Species	Seedling count m ⁻¹		DM yield kg ha ⁻¹	
	LS mean	SE	LS mean	SE
Alfalfa	14.4	4.0	2439	242
Birdsfoot trefoil	104.0	12.5	--	--
Cicer milkvetch	17.4	8.8	1535	997
Purple prairie clover	78.0	12.5	200	814

Sainfoin?

MEAN SEEDLING ESTABLISHMENT BY SOIL ZONE FROM 9 REPORTS

Soil Zone		Seedlings	SE
Brown		9.5	13.0
Dark Brown		10.0	39.0
Black		15.1	11.7
Grey		58.7	8.7
Irrigation		14.6	27.5

SOD-SEEDED ALFALFA SEEDLING NUMBER PER M ROW AS INFLUENCED BY APRIL TO JUNE PRECIPITATION AT 9 SITE-YEARS IN THE PRAIRIE REGION AND 11 SITE-YEARS IN THE PARKLAND REGION. LINEAR REGRESSION EQUATIONS ARE SIGNIFICANT AT P=0.016 AND 0.007, RESPECTIVELY.



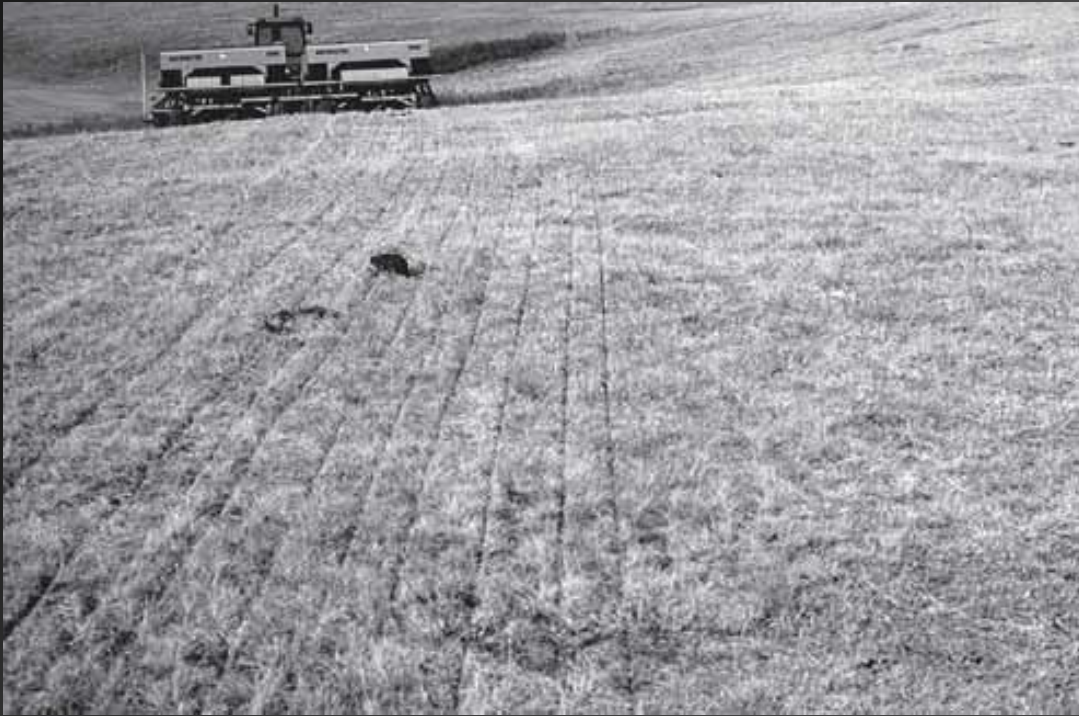
EQUIPMENT FOR SOD-SEEDING



BROADCAST VS DRILL SEEDING



HOE DRILL VS AIR-SEEDERS





2

3

1

4

5

6



Opener	Seedlings per m row	DM forage yield kg ha⁻¹	% alfalfa
1	51.6	3036	31.5
2	52.1	2712	31.2
3	37.7	2476	17.5
4	50.7	2807	31.4
5	46.6	2963	27.4
6	57.8	2533	32.1
7 control D	0	2601	0
8 control	0	2420	0
P value	<0.01	0.40	<0.01

CONCLUSIONS

- Vegetation control is needed – herbicide vs grazing
- Avoiding water stress is essential
- Soil zone differences
- Species:
 - Alfalfa is most predictable legume
 - Cicer milkvetch in wetter zones
 - Sainfoin needs more research
- Zero-till seeding equipment will work for sod-seeding
- Fertilizer: starter P

ACKNOWLEDGEMENTS

- Saskatchewan Crop Insurance Corporation provided financial support to this project



QUESTIONS

Thank you.

PaulJeffersonSask@gmail.com