

GOVERNMENT

COMPANION CROPPING CLOVERS WITH MAIN ROTATIONAL CROPS IN THE PEACE REGION

CROP STANDS, CROP BIOMASS, YIELD AND PROTEIN/OIL CONTENT

Crop stand counts seeded either as monocrops, interseeded with either white, crimson or subterranean clover. Clover was either interseeded with cash crop or broadcasted across the plot.

		plants foot-2	
Broadcast	Canola	Crimson	2.49 EF
		None	2.30 F
		Subterranean	2.68 EF
		White	2.08 F
Wheat		Crimson	4.79 BCD
		None	5.43 BC
		Subterranean	5.57 BC
		White	4.58 BCD
Disk drilled	Canola	Crimson	3.61 DE
		None	2.57 EF
		Subterranean	4.34 CD
		White	2.39 EF
Wheat		Crimson	5.66 B
		None	4.99 BC
		Subterranean	4.59 BCD
		White	7.10 A
Standard error		0.4	

Canola and wheat emergence differed regardless of clover species of seeding method ($P=0.0195$). As such, wheat emerge and proliferated faster than canola seedlings. Crop stand counts taken on June 29 (23 days after seeding), showed no difference across treatments.

Differences, however, were observed in stand counts taken on June 29 (23 days after seeding). There was more canola than wheat counts ($P=0.0011$), and more stand counts were observed in plots where clover was disk drilled compared to plots where clover was broadcasted ($P=0.0445$). Crop stand counts were affected by an interaction between crop species and clover species. Wheat stand counts were greater than canola counts regardless of clover species being seeded where canola stands were less numerous in plots where subterranean clover was white clover was seeded compared to plots sown to subterranean clover. Canola stands in plots sown to crimson clover were the same as those plots sown to either white or subterranean clover. A triple interaction between crop species, clover species and seeding method influenced stand number during the same period. Wheat stands were greater in interseeding systems with white clover, compared to plots where white clover was broadcasted. There was no difference in wheat stands in plots that were seeded to either crimson or subterranean clover with wheat plots sown as a monocrop and there was no difference whether clover was disk drilled or broadcasted. Canola stand counts were greater when intersown with subterranean clover compared to plots where the same clover species was broadcasted. There was no difference in canola stands sown with crimson clover in either seeding method. Similarly, canola stand number is the same in plots where white clover was either broadcasted or disk drilled and where either white clover or no clover was present in plots.

GOVERNMENT

COMPANION CROPPING CLOVERS WITH MAIN ROTATIONAL CROPS IN THE PEACE REGION

Clover establishment will vary according to (a) seeding method: Disc drill will provide more tillage, thus incorporating the clover seed into the ground, and improving stand establishment, as compared to broadcasting seed; (b) clover species: crimson clover will have a deeper root system compared to subterranean and white clover, and thus will have access to more moisture in the spring; (c) cash crop: clovers will establish more successfully with canola, as there will be less competition for light; and (d) soil type: crimson clover will provide better establishment in well-drained soils (loams) than white or subterranean clover, owing to its deeper root system. Hence objectives are: First, determine which method provides the best establishment of both clover species and cash crop: seed drill or broadcast; and second, to evaluate weed control and fertility. Once more data is compiled through the years soil quality and economics could also be evaluated.

Crop stand counts seeded either as monocrops, interseeded with either white, crimson or subterranean clover. Clover was either interseeded with cash crop or broadcasted across the plot.

Parameters affected by cash crop seeded either as monocrops, interseeded with either white, crimson or subterranean clover. Clover was either interseeded with cash crop or broadcasted across the plot.

	Crop emergence		Crop counts		Clover biomass		Crop biomass		Yield		Test weight	
	plants foot-2 (Standard error)		plants foot-2 (Standard error)		lb acre-1 (Standard error)		bu acre-1 (Standard error)		lb bu-1 (Standard error)			
Canola	June 29		August 24		June 29		August 24		June 29		August 24	
	0.65	2.21	3.74	4.41	10.83	17.30	41.45	35.66	23.47	4.42	60.43	57.55
Wheat	(0.2)	(0.2)	(0.1)	(0.1)	(2.7)	(1.0)	(1.7)	(0.6)	(1.1)	(1.0)	(1.0)	(1.0)
	B	A	B	A	B	A	B	B	A	B	A	B

Crop	Clover	June 29		August 24	
		plants foot-2	(standard error)	plants foot-2	(standard error)
Wheat	White	11.25	(1.4) A	17.47	(1.4) A
	Crimson	12.6	(1.4) A	11.99	(1.4) BC
	Subterranean	11.25	(1.4) A/B	10.22	(1.4) CD
	None	9.76	(1.4) A/B	15.33	(1.4) AB
Canola	White	9.11	(1.4) A/B	5.02	(1.4) E
	Crimson	9.01	(1.4) A/B	6.88	(1.4) DE
	Subterranean	10.9	(1.4) A/B	5.86	(1.4) E
	None	7.06	(1.4) B	8.27	(1.4) CDE

Number of stands observed in August 24 (80 days after seeding) showed that wheat stands were more numerous (P=0.0043) than canola crop stands. In addition, crop stands in general, were greater in plots where white clover was broadcasted in comparison to plots broadcasted with subterranean clover (P=0.0481).

By the end of August crop biomass in canola was greater than that of wheat given the plant physiology of each (P=0.0076). Moreover, given that canola can produce more seeds than wheat, it is congruent to see greater yield and test weight in this brassica rather than its cereal counterpart (P=0.0069 and 0.0001 for yield and test weight respectively). There were, however, no other effects influencing crop biomass or yield. It can be argued that while disk drilled sowing of clover may aid in N availability for the crops more directly, statistical values indicate there is no disadvantage to clover seed broadcasting.

GOVERNMENT

COMPANION CROPPING CLOVERS WITH MAIN ROTATIONAL CROPS IN THE PEACE REGION

Parameters affected by seeding method in wheat and canola sown either as monocrops, interseeded with either white, crimson or subterranean clover. Clover was either interseeded with cash crop or broadcasted across the plot.

	Clover stand counts						Weed biomass		
	June 29			August 24			lb acre-2		
	plants foot-2 (Standard error)								
Broadcast	0.35	(3.0 X10-2)	B	4.20	(1.6)	B	11.39	(0.8)	B
Diskdrilled	1.53	(3.0 X10-2)	A	8.20	(1.6)	A	13.99	(0.4)	A

Clover stand counts in June 29, 2023 which were either sown as a monocrop or with wheat or canola. Clover was either interseeded with cash crop or broadcasted across the plot.

Broadcast	White	0.22	(3.3x 10-2)	CD
	Crimson	0.28	(3.2 x 10-2)	CD
	Subterranean	0.16	(3.6 x 10-2)	D
	None	1.42	(8.3 x 10-2)	E
Disk drilled	White	0.49	(3.2 x 10-2)	CD
	Crimson	0.78	(3.2 x 10-2)	BC
	Subterranean	2.97	(3.2 x 10-2)	A
	None	4.86	(4.1 x 10-2)	AB

Clover stand counts which were either sown as a monocrop or with wheat or canola. Clover was either interseeded with cash crop or broadcasted across the plot.

	June 29		August 24	
	plants foot-2			
White	0.33	C	5.14	B
Crimson	0.47	BC	4.47	B
Subterranean	0.59	AB	8.80	A
None	2.62	A	0.00	C
Standard error	3.0 X10-2		1.7	

While yield was not affected by seeding method, protein and oil content diverged whether clover species were broadcasted or seeded within the same row as the crop seed (P=0.0364). Protein content was greater in wheat seeded in broadcasted clover. In contrast, oil content in canola was the opposite, and more of it was found in stands intersown with clover. Dry conditions may reduce N availability and thus protein content increases in wheat. In canola, availability of N through clover interseeding may cause canola to accumulate more oil content in its seeds.

CLOVER COUNTS AND BIOMASS

Seeding was done before a rain event to ensure proper moisture for clover emergence. Emergence was difficult for all species. By the time emergence counts were taken, white clover was the most predominant with an average of one clover emerged per plot. Stand counts taken on June 19 showed that subterranean clover was more numerous in plots where it was disk drilled along with the crop than in plots where it was broadcasted. Stand counts for white and crimson clover were the same whether disk drilling or broadcasting was used for sowing. By the end of August, three main observations stood out. First, subterranean clover had greater stand numbers compared to white or crimson clover (P=0.0118). Second, clover is a poor competitor, and more stands were found in plots where no crop was present (P=0.0005). And third, clover is more abundant if sown within the crop rather than randomly disseminated over the field.

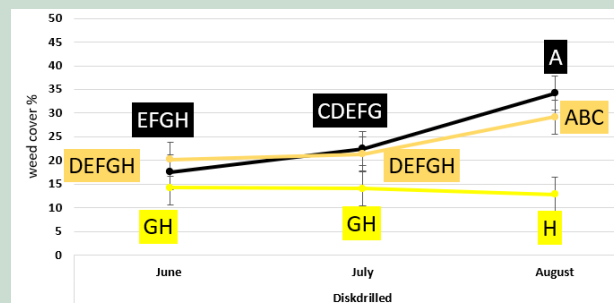
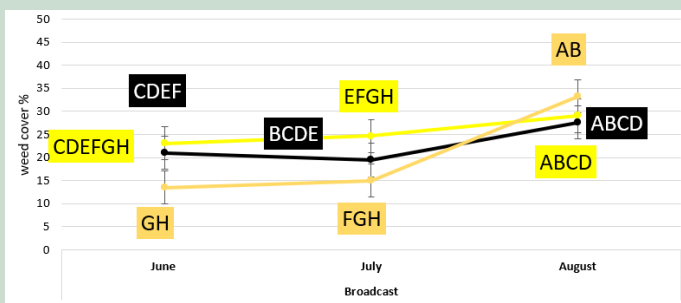
Biomass in fact, presents conflicting values. Neither clover species, nor seeding method influence clover biomass and instead, clover biomass seemed to be much more prominent in plots where canola was planted in comparison to plots planted with wheat or clover monocrops (both broadcasted or disk drilled) (P=0.034).

GOVERNMENT

COMPANION CROPPING CLOVERS WITH MAIN ROTATIONAL CROPS IN THE PEACE REGION

WEED COVER AND BIOMASS

As the growing season was progressing, the weed cover in all plots increased ($P < 0.0001$). Weed cover was greater in plots seeded with wheat or clover monocrops compared to plots where canola was seeded ($P = 0.0055$). In plots sown to canola, and broadcasted with clover, more weed cover was found compared to that observed in plots where canola was interseeded with clover ($P < 0.0001$). Weed biomass by the end of the season was difficult to remove in plots with subterranean and white clover. Moreover, clover seemed to be a better competitor with weeds than cash crops were. As such, weed biomass was greater in plots where clover was disk drilled rather than broadcast seeded throughout the plot.



KEY POINTS:

- Clover stand counts were more numerous in disk drilled plots than in plots where it was broadcasted
 - By the end of the season there were more clover stands in canola seeded plots than in wheat plots
- Weed biomass was more prominent in plots seeded with wheat or monocrops of clover than in canola seeded plots
- There was no effect of clover species or clover seeding method on yield and test weight of both canola and wheat
- Protein content was greater in wheat seeded in broadcasted clover. In contrast, oil content in canola was the contrary, and more of it was found in stands intersown with clover