

# Crop rotation tables: back by popular demand

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**F**armers enjoy flirting with sexy new varieties and new or improved products, but when it comes to tried-and-true production strategies, crop rotation is the steady standby.

The tables on the following page are some of the most requested pieces of information that Manitoba Agricultural Service Corporation (MASC)/Manitoba Agriculture, Food and Rural Development (MAFRD) receives.

The popularity of these charts relates to the fact that they are useful agronomic 'real-life' management information. Over your fields and others in Manitoba, we consistently see some crops performing better when planted after others.

These charts provide trends that can be used to help with crop choice planning, whether it's deciding how to sequence your tried-and-true or new crops you are plugging into your field cycle.

The crop rotation charts in this article look at the

Regardless of the timeline for the crop rotation chart, these trends have stayed the same:

- **Crop on same crop stubble — yield lost 10-15 per cent** (see *Tables 1 and 2*)

**Potential reasons:** Diseases overwintering on crop stubble and then affecting the next perfect host crop. Examples are blackleg (canola), FHB (wheat, barley, oat, corn), wheat streak mosaic (winter wheat or spring wheat on winter wheat).

**Exception:** Soybean results were positive in 2000-12, but negative in 2008-12 dataset. The reasons the yield decline is not higher is soybean is a relatively new crop in many areas and the diseases overwintering on stubble may not be present yet. Another reason could be the benefits of black soil for a second soybean crop and potentially higher populations of rhizobium after the first crop, both making yield loss due to disease less obvious. Proceed with caution in the future, as the more soybean crops planted, more pests will occur and build up.

- **Influence of arbuscular mycorrhizal fungi on next crops — yield loss of two to 12 per cent** (*Tables 1 and 2*)

**Potential reasons:** Arbuscular mycorrhizal fungi (AMF) are those symbiotic fungi in the soil that greatly assist crops such as flax and corn with early-season phosphorus uptake,

which is needed to get the crop to a good start and yield potential. They help cereals as well, but not to the same extent. Canola though does not need the AMF and in a canola crop year, the AMF numbers decline.

This means the population of AMF is not there early on for the next crop and if they need it. The obvious result is yield loss, but also delayed maturity and higher moisture grain at harvest. So for the 20 per cent of fields in which Manitoba farmers are planting corn after canola, try another crop because this could be bumping up your drying costs in the fall!

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yields and frequency of planting for a long period of 2000-12 and then the shortened 2008-12 timeline.

The reason for the split focus was the change in the composition crop types planted in Manitoba in 2008 and afterwards, specifically that of increased soybean-corn, and decreased peas-flax.

Both charts offer a snapshot of the impact of the previous year stubble type on present year crop yields. Average yields and acreages for the crop types have also been included to provide more information. Remember, these numbers are based on the information MASC contract holders provided back to MASC on the annual yields and previous crops planted. It only includes information on fields over 120 acres.

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**Table 1: Relative Yield response (per cent of 2000-2012 average) of Manitoba crops sown on previous crops (stubble >120 acre)**

Previous Crop	Crop Planted									
	Winter Wheat	Spring Wheat	Barley	Oat	Canola	Flax	Field Pea	Soybean	Sunflower	Grain Corn
Winter Wheat	67	83	102	101	95	106	99	103	98	84
Spring Wheat	89	88	100	101	104	103	103	102	100	96
Barley	88	90	87	93	100	98	97	95	99	87
Oat	88	89	87	84	92	95	95	104	101	97
Canola	104	103	105	104	84	88	92	102	84	97
Flax	86	96	106	99	100	77	89	89	101	NSD
Field Pea	NSD	103	104	106	102	117	82	NSD	NSD	NSD
Soybean	NSD	105	107	102	87	99	NSD	104	86	98
Sunflower	NSD	97	102	94	NSD	NSD	NSD	97	95	100
Grain Corn	NSD	NSD	102	108	104	NSD	NSD	98	103	89
<i>Yield (bu/ac)</i>	<i>60</i>	<i>43</i>	<i>61</i>	<i>88</i>	<i>32</i>	<i>20</i>		<i>28</i>	<i>1389lb</i>	<i>89</i>

**Table 2: Relative Yield response (per cent of 2008-2012 average) of Manitoba crops sown on previous crops (stubble >120 acre)**

Previous Crop	Crop Planted									
	Winter Wheat	Spring Wheat	Barley	Oat	Canola	Flax	Field Pea	Soybean	Sunflower	Grain Corn
Winter Wheat	78	74	106	100	97	107	107	101	97	87
Spring Wheat	86	85	98	101	104	104	103	103	101	100
Barley	83	89	84	93	100	96	101	100	97	99
Oat	76	90	86	82	92	95	97	99	100	93
Canola	104	102	103	104	85	88	92	101	95	95
Flax	102	98	110	97	104	73	101	96	98	NSD
Field Pea	NSD	100	104	98	104	124	NSD	NSD	NSD	NSD
Soybean	NSD	106	106	105	98	100	NSD	95	92	103
Sunflower	NSD	99	102	96	NSD	NSD	NSD	99	88	99
Grain Corn	NSD	NSD	101	106	104	NSD	NSD	107	112	87
<i>Yield (bu/ac)</i>	<i>65</i>	<i>47</i>	<i>62</i>	<i>95</i>	<i>34</i>	<i>20</i>		<i>32</i>	<i>1521lb</i>	<i>95</i>

**Table 3: Previous crop (stubble) distribution (%) of large acreage fields (>120 acres) sown to the major field crops in Manitoba during the period 2000-2012**

Previous Crop	Crop Planted									
	Winter Wheat	Spring Wheat	Barley	Oat	Canola	Flax	Field Pea	Soybean	Sunflower	Grain Corn
Winter Wheat	1	4	4	3	4	6	8	6	11	3
Spring Wheat	2	10	24	23	51	55	56	23	38	11
Barley	4	2	9	6	11	11	10	4	8	4
Oat	4	3	5	4	7	9	6	14	18	5
Canola	69	57	35	36	5	5	5	18	1	18
Flax	1	6	4	4	2	<1	1	1	2	NSD
Field Pea	NSD	3	1	1	5	NSD	1	NSD	NSD	NSD
Soybean	NSD	2	2	8	2	1	NSD	13	2	11
Sunflower	NSD	3	4	3	NSD	NSD	NSD	2	<1	4
Grain Corn	NSD	NSD	1	1	1	NSD	NSD	3	3	9
<i>Yield (bu/ac)</i>	<i>268,600</i>	<i>2,316,700</i>	<i>676,700</i>	<i>617,900</i>	<i>2,488,900</i>	<i>266,400</i>		<i>309,700</i>	<i>148,600</i>	<i>152,400</i>

**Table 4: Previous crop (stubble) distribution (%) of large acreage fields (>120 acres) sown to the major field crops in Manitoba during the period 2008-2012**

Previous Crop	Crop Planted									
	Winter Wheat	Spring Wheat	Barley	Oat	Canola	Flax	Field Pea	Soybean	Sunflower	Grain Corn
Winter Wheat	1	4	6	4	5	3	10	7	14	4
Spring Wheat	1	5	17	14	48	50	45	22	31	10
Barley	3	1	7	4	9	9	9	3	8	4
Oat	3	2	5	3	7	11	9	14	20	5
Canola	71	63	41	42	7	8	10	21	2	22
Flax	1	4	4	3	2	<1	1	1	1	NSD
Field Pea	2	1	1	7	1	NSD	NSD	NSD	NSD	NSD
Soybean	NSD	4	3	14	3	2	NSD	15	4	16
Sunflower	NSD	3	5	4	NSD	NSD	NSD	2	<1	3
Grain Corn	NSD	NSD	1	1	1	NSD	NSD	3	4	8
<i>Yield (bu/ac)</i>	<i>330,100</i>	<i>2,109,600</i>	<i>450,000</i>	<i>485,400</i>	<i>2,946,400</i>	<i>168,200</i>		<i>555,300</i>	<i>108,600</i>	<i>184,600</i>

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- **Oilseed-pulse on cereal and vice versa = a four per cent loss to 10 per cent gain**

**Potential reasons:** Rotating between a broadleaf crop to a grass and vice versa is one of the best options for year-after-year planting. Between the two plant types, diseases and other pests differ, which increases chances of yield boost as pests.

**Exceptions:** It's not only pests that cause an increase or decrease in yield. Other factors occurring in crop can carry over to the next crop such as herbicide residues, excess stubble trash reducing plant establishment the next spring.

The above are the obvious items we can explain that influence yields of the next crop on stubble. There are many less obvious ones that have a large contribution to the next crop as well that need to be managed:

- Trash remaining from last crop affecting emergence and establishment of next crop;
- Over- or underfertility in previous crop affecting the next crop;
- Herbicide carry-over in the soil affecting the next crop;
- Water use or depth of use impacting the next crop.

These too need to be considered before coming to the final conclusion of what crop you are going to plant on which stubble left over from the previous year.



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