Weather*man-ager*

Managing Weather Risk

Scott, Saskatchewan

Management of fertility, crop residue, weeds, insects and diseases are all part of good agronomic practice in Prairie Agriculture. However, producers have traditionally reacted to climatic variability rather than managing it. Many producers manage the economic influence of climatic variability through participation in crop and hail insurance, but to date the only agronomic management tools have been in the form of early maturing crops.

The Weather*man-ager* is a management tool that gives you access to 53 years of weather records. It can help predict the probability of crops reaching maturity based on different seeding dates.

What is physiological maturity?

Physiological maturity is the point at which maximum kernel dry weight is achieved.

Physiological maturity coincides with the earliest time a crop could be sprayed with pre-harvest glyphosate or swathed.

Actual harvest date typically occurs 10 to 14 days after physiological maturity date.

How does a probability table work?

The probability tables included in this document depict alternative seeding dates on one axis and physiological maturity date on the other axis.

The values within the table indicate how many years out of 100 a crop would reach physiological maturity for that seeding date.

How were the probability tables developed?

Weather data from Environment Canada was analysed from 1945 to 1998 for selected weather stations. Growing Degree Day (GDD) accumulations were then calculated for each station based on a variety of seeding dates.

What is a Growing Degree Day and how is it calculated?

Growing Degree Days are a commonly used method of measuring and displaying heat accumulation and crop heat requirements. An example of the calculation utilized to measure growing degree accumulation for a summer day with a high of 20 Celsius and a low of 10 Celsius would be as follows:

GDD = (20(daily high) + 10 (daily low) / 2) – 5
= (30 / 2) –5
= 15 – 5
= 10 GDD accumulated during our example summer day.

* All temperatures are in degrees Celsius.
* Five is subtracted from the average of the daily high and low temperatures, as 5 Celsius is the generally accepted minimum temperature requirement for plant growth and development.

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What are GDD requirements for crops grown in Western Canada?

Research done by Dr. Brian Fowler and Brian Duggan at the University of Saskatchewan has shown little geographic variability in GDD requirements for crops throughout Western Canada. For example, Argentine Canola grown in Prince Albert and Shaunavon require approximately the same 1040 GDD to reach physiological maturity. Physiological maturity is determined primarily by heat accumulation; moisture levels only affect physiological maturity under extreme drought conditions.

Crop	GDD Requirement
Flax	1200
HRSW	1175
Argentine Canola	1040
Mustard	1004
Oats	961
Barley	850
Polish Canola	850

GDD requirements shown are for an average of varieties commonly grown in Prairie Canada.

An example of using the *Weatherman-ager* to plan winter wheat seeding would be:

Recommended seeding window for Winter Wheat seeding is Aug. 25 to Sept. 15.
Optimum date for seeding Winter Wheat at Scott, SK: September 3
To have stubble available following a crop of Argentine Canola:
Estimated harvest date: Aug 19 to 24
Probability of physiological maturity by Aug. 20: 70%
Argentine Canola seeding date to achieve winter wheat seeding date: May 1

This table can also be utilized to determine the probability of achieving physiological maturity prior to first fall frost.

An example of using the *Weatherman-ager* to plan spring seeding would be:

Average first fall frost at North Battleford, SK. (Closest available recording) – September 19
Argentine Canola seeding date necessary to avoid average first frost date: May 30

Example: Argentine Canola at* Scott, *Saskatchewan

Physiological Maturity Date

Seed Date	05-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	04-Sep	09-Sep	14-Sep	19-Sep
01-May	4	15	42	70	81	94	96	100	100	100
05-May	4	11	38	60	77	89	96	100	100	100
10-May	4	6	25	55	74	87	91	96	100	100
15-May	2	6	11	42	66	81	91	91	96	98
20-May	0	4	6	25	55	74	87	91	92	94
25-May	0	0	4	19	34	64	77	87	89	91
30-May	0	0	0	4	26	42	64	75	85	87
04-Jun	0	0	0	0	8	25	43	57	72	81
09-Jun	0	0	0	0	0	8	26	38	53	66

The *Weatherman-ager* tables were generated using Environment Canada weather station data collected from _1945_ to _1998_.

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Scott, Saskatchewan (4047240)

The table below was generated from Environment Canada weather station data collected from 1945 to 1998.

Crops:

Argentine Canola

Physiological Maturity Date

Seed Date	05-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	04-Sep	09-Sep	14-Sep	19-Sep
01-May	4	15	42	70	81	94	96	100	100	100
05-May	4	11	38	60	77	89	96	100	100	100
10-May	4	6	25	55	74	87	91	96	100	100
15-May	2	6	11	42	66	81	91	91	96	98
20-May	0	4	6	25	55	74	87	91	92	94
25-May	0	0	4	19	34	64	77	87	89	91
30-May	0	0	0	4	26	42	64	75	85	87
04-Jun	0	0	0	0	8	25	43	57	72	81
09-Jun	0	0	0	0	0	8	26	38	53	66

Flax

Physiological Maturity Date

Seed Date	05-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	04-Sep	09-Sep	14-Sep	19-Sep
01-May	0	0	2	6	19	43	57	74	83	87
05-May	0	0	2	6	17	38	53	68	75	87
10-May	0	0	2	4	11	30	45	60	70	77
15-May	0	0	0	4	8	17	38	47	64	74
20-May	0	0	0	2	4	11	25	38	51	58
25-May	0	0	0	0	2	6	19	28	36	47
30-May	0	0	0	0	0	2	11	17	26	36
04-Jun	0	0	0	0	0	0	2	2	13	25
09-Jun	0	0	0	0	0	0	0	0	0	2

HRS Wheat

Physiological Maturity Date

Seed Date	05-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	04-Sep	09-Sep	14-Sep	19-Sep
01-May	0	2	4	13	32	51	68	81	87	89
05-May	0	2	4	9	23	49	66	77	85	87
10-May	0	0	4	8	17	38	60	70	77	87
15-May	0	0	0	6	11	28	47	58	74	79
20-May	0	0	0	2	6	15	32	47	60	72
25-May	0	0	0	0	2	9	23	38	45	55
30-May	0	0	0	0	0	2	13	25	36	40
04-Jun	0	0	0	0	0	0	2	8	23	30
09-Jun	0	0	0	0	0	0	0	0	6	15

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Mustard

Physiological Maturity Date

Seed Date	05-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	04-Sep	09-Sep	14-Sep	19-Sep
01-May	8	30	58	81	92	96	100	100	100	100
05-May	6	19	55	75	87	96	98	100	100	100
10-May	6	11	45	68	85	92	98	100	100	100
15-May	4	8	34	60	79	91	94	96	98	100
20-May	4	6	15	49	72	87	91	94	96	100
25-May	0	4	6	26	57	77	87	89	92	96
30-May	0	0	4	17	32	58	75	87	91	91
04-Jun	0	0	0	2	26	36	64	74	83	87
09-Jun	0	0	0	0	4	25	40	55	72	81

Oat

Physiological Maturity Date

Seed Date	05-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	04-Sep	09-Sep	14-Sep	19-Sep
01-May	19	51	75	91	98	100	100	100	100	100
05-May	13	43	72	89	96	100	100	100	100	100
10-May	6	32	68	83	91	98	100	100	100	100
15-May	6	19	58	75	91	94	96	100	100	100
20-May	4	9	38	66	89	91	96	98	100	100
25-May	0	4	23	51	77	89	92	96	96	98
30-May	0	0	9	26	57	77	89	91	96	96
04-Jun	0	0	2	15	34	58	81	87	92	94
09-Jun	0	0	0	0	21	36	58	72	83	87

Polish canola / Barley

Physiological Maturity Date

Seed Date	05-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	04-Sep	09-Sep	14-Sep	19-Sep
01-May	77	91	100	100	100	100	100	100	100	100
05-May	70	91	100	100	100	100	100	100	100	100
10-May	64	87	94	100	100	100	100	100	100	100
15-May	51	85	92	96	100	100	100	100	100	100
20-May	32	74	91	92	98	100	100	100	100	100
25-May	13	55	85	92	94	98	98	100	100	100
30-May	6	28	57	87	92	96	98	100	100	100
04-Jun	0	9	34	68	87	94	98	100	100	100
09-Jun	0	0	11	40	72	91	92	98	100	100

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