Manitoba Agriculture
Potato DSV Advisory Analysis

Model Extraction from ADCON
addVantage 3.45

Performed By:

Mr. Jon Brinkman

Weather Innovations Incorporated

Table Of Contents

Project Overview:

This document was prepared in response to a request to determine the parameters, thresholds, and data sets used in the Manitoba Agriculture DSV program, originally programmed into addVantage 3.45. The ManAg DSV program as incorporated into addVantage 3.45 is comprised of 2 distinct DSV programs, a modified Wisdom program and a modified TomCast program.

Research Background:

Mr. Jon Brinkman, having a 6 year history of working with TomCast programming extracted the following information from the Manitoba Agriculture extension in addVantage 3.45, with the guidance of Dr. Ron Pitblado, creator of TomCast.

Mr. Jon Brinkman

Dr. Ron Pitblado

Determination of model parameters and data sets used was made be employing recursive data inputs, and evaluating the respective outputs.

Model Inputs:

Wisdom Inputs:

- Base Dataset: 15 minute data
- Weather variable: RH
- Weather variable: Temperature

TomCast Inputs:

- Base Dataset: 15 minute data
- Weather variable: RH
- Weather variable: Temperature

Model Parameters:

The rules for the ManAg DSV as programmed into addVantage 3.45 can be summarized as follows:

The model has 2 parts, and the switch point from the first model (modified Wisdom) to the second model (modified TomCast) is set by the user in the advantage software. Both parts of the model run from 15 minute data - use of hourly data instead of 15 minute will yield some values that differ from those given by the 3.45 model. For both portions of the program, the "model day" runs from noon to noon (1215 time slot to and including 1200 time slot next day).

The Wisdom model works by simply summing the number of 15 minute periods of the day (noon to noon) where RH >=90%, and taking the average temperature during the wet periods. Breaks between wet periods do not matter. To get the DSV, the number of 15 minute blocks must be converted into hours by dividing by 4. Rounding is as follows: if remainder is one 15 minute block, round down; if remainder is 2 fifteen minute blocks, round down. If remainder is three 15 minute blocks, round up to next whole hour. The number of wet hours is then used with the average temperature during all of the wet 15 minute timeslots to determine the DSV from the chart (see attached Excel sheet). Note that the lower limit is 45F or 7.0C degrees - this is a "hard floor", *ie* do not round up to 7C, anything less than an average temperature of 7C is 0 DSV. Except for this lower limit, temperatures are rounded to the nearest whole degree Celsius.

Once the threshold DSV is reached (typically 18), the model switches over to TomCast. Note that the day that brings the DSV to, or over 18 is still calculated using Wisdom. The same cutoff is used for this portion as for the Wisdom portion: RH>=90%. The number of "wet" 15-minute periods during a day (noon to noon) is summed, and the average temperature during wet periods is calculated. Note that this is a deviation from the original TomCast program, which has a set of rules concerning what to do with breaks in hours of LW. Rounding for hours of LW is the same as the Wisdom component – one or two 15 minute blocks rounds down, 3 fifteen minute blocks rounds up. The LW and Temperature numbers are used to look up the daily DSV from the revised TomCast chart (attached). Of importance is the "hard floor" found here as well, set this time at 9.0C – again, do not round up to 9 from 8.x – anything below 9.0 is a 0 DSV. There also appears to be a "hard ceiling" in the TomCast chart, in which "wet hours" where the temperature exceeds 27.0 C are not counted as wet hours. The result of ignoring the LW hours above 27.0C is that the average temperature will never be more than 27.0C, therefore those columns of the chart are irrelevant. As with the Wisdom component of the program, temperatures are rounded to the nearest degree Celsius, except at the lower limit.

Table 1. Wisdom DSV Lookup Table (as Implemented in addVantage 3.45 Manitoba Extension)

ManAg Modified Wisdom

Hours of Leafwetness	Average Temp (°C) during RH >=90																						
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
14	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
16	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
17	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
18	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
19	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
20	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
21	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
22	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
23	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
24	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

Table 2. TomCast DSV Lookup Table (as Implemented in addVantage 3.45 Manitoba Extension)

ManAg Modified Tomcast

Hours of Leafwetness	Average Temp (°C) during RH >=90																								
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	---	---
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	---	---
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	---	---
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	---	---
4	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	---	---
5	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	---	---
6	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	1	1	---	---
7	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	---	---
8	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	---	---
9	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	---	---
10	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	---	---
11	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	---	---
12	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	---	---
13	0	0	2	2	2	2	1	1	1	1	1	2	2	2	3	3	3	3	3	2	2	---	---
14	0	0	2	2	2	2	1	1	1	1	1	2	2	2	3	3	3	3	3	2	2	---	---
15	0	0	2	2	2	2	1	1	1	1	1	2	2	2	3	3	3	3	3	2	2	---	---
16	0	0	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	---	---
17	0	0	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	---	---
18	0	0	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	---	---
19	0	0	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	---	---
20	0	0	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	---	---
21	0	0	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	---	---
22	0	0	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	---	---
23	0	0	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	---	---
24	0	0	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	---	---