



WEATHER TIME SPRAY APPLICATIONS

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Growers have used weather to base their farming decisions from the beginning of time. What is new is our ability to better record the critical weather parameters for insect and plant disease development and as important both move and incorporate the data into packages that can readily be accessed by growers.

Monitoring insect development is relatively easy in that insect growth patterns are almost entirely based on temperature. So long as the temperature sensors are located in areas where the insect is situated, using growing degree days can mimic the development of each of the growth stages of any insect. The growing degree day calculation uses the average daily temperature minus a base temperature which is unique for each insect. The advancements in this calculation is the use of hourly temperature values rather than the earlier maximum – minimum and divide by 2 to give you the average daily temperature. We have moved this yardstick ahead.

However, recording the development of plant diseases is far more difficult. Historically, relative humidity, rainfall events, temperature and sometimes wind and solar radiation have been used to monitor the development of plant diseases with varying success. The two most critical aspects in plant disease forecasting that have not been addressed successfully are determining leafwetness and the need for site specific weather information.

Before anyone can comfortably use disease forecasting models these two aspects of the “science” need to be understood. Yes, there are lots of spray models available that use relative humidity as a surrogate for leaf wetness however the accuracy is low and in some years may result in less than acceptable recommendations. Also there are weather networks available that use airport weather data and sometime scattered weather stations that try to “calculate” what is happening on your farm but that too is often only an “estimate” and it too may not be as accurate for many growers whose farm income depends on accurate recommendations.

It is from this basis that Weather Innovations Incorporated (WIN) a recent spin-off company from the University of Guelph in Ontario, Canada, has attempted to address both critical needs – leafwetness and site specific weather data.

A new WIN cylindrical leaf wetness sensor has been developed and has been field tested for many years. It is the basis for the recommendation of fungicide sprays for processing tomatoes (TomCast) and for sugarbeets (BeetCast). The sensor reflects the wetting and as important the drying down of plant foliage. Along with the highly accurate temperature sensors available today these two weather parameters constitutes the capability to “sense” the day from being favourable or unfavorable for disease development or anything in between. This new breakthrough technology can be used for many diseases. One of the aspects that plant diseases have in common is the essential requirement for “free moisture” i.e. leaf wetness on the plant surface for spore germination and infection. In the development of TomCast and BeetCast, I have used the two most critical factors, temperature and leaf wetness, and when recorded on an hourly basis have developed a disease severity value (DSV) numbering system that reflects the level of fungal activity during those conditions for that day. Knowing how often these conditions are met gives us an accurate understanding on disease development and can be translated into the optimum time to apply a control measure, the application of a fungicide.

Weather based decision models will be reviewed using wheat, canola, potatoes, tomatoes, sugarbeets and chickpeas as examples of near-real time deliverables.

Growers having large acreages tell me that they are not that flexible when they can spray. Just to be able to cover their acreage they often have found the need to follow a fixed spray schedule. This is understandable but they too can benefit from knowing the levels of disease development. Often the fungicide label recommends a range of rates depending on the disease pressure. Growers however find it difficult to vary fungicide rates as they have little to base their decisions on. Now using Disease Severity Values, DSVs, derived from the critical weather information, a large grower can decide whether to use the higher or lower fungicide rate. The higher and faster the DSVs accumulate over a rolling 7-10 days, the grower would likely choose to use the high fungicide rate however when conditions are not favourable for disease development yet the grower has scheduled a spray application, the lower rate would be used, resulting in both excellent disease control and considerable savings on the spray bill.

The other critical aspect of disease forecasting is acquiring weather data that is representative of the field and delivered and translated into DSVs in a timely manner. Growers now have opportunities using provincial programs to access weather station funding. It is my experience that growers should consider working with companies such as Weather Innovations Incorporated that locate weather stations on or near their properties and use them to maintain the weather station. One of the worst scenarios is having a weather station that outputs the wrong data due to the lack of a proper maintenance schedule. Weather stations do not “fix themselves”.

You may wish to contact Ian Nichols at 519-352-5334 or at inichols@weatherinnovations.com

Have a safe and effective spray season this coming year.