...FROM THE DESK OF
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CCA 4R

Between the Rows

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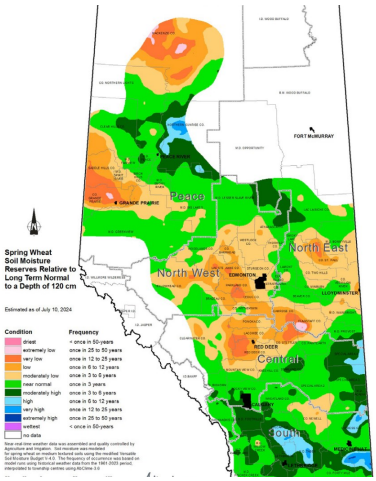
INSIDE THIS ISSUE:

Soil Moisture Update

Soil moisture levels have taken a battering over the past 2 weeks. The last map I showed had a lot of green, now we're seeing a lot of orange and red. Since June 20, Fort Vermilion has only received 20mm of rain, 13.7 coming in the thunderstorm on July 11. As a result many growers have backed away from fungicides. I'll discuss that in the next article. But more than the lack of moisture has been the extreme heat. Canola is a "cool-season: crop. It performs best with warm days and cool nights. I'll also discuss heat and its effects on canola later in this issue. So our soil moisture has gone quickly from excellent to challenging. 5 days of plus 30C temperature will do that. Basically we need rain.



Fungicides in a "dry year"

Should you spray fungicides in a dry year? While many will absolutely say no, there can be benefits. When deciding on a fungicide application or not, we can't just focus on the weather. We need to look more at the bigger picture.

Susceptibility and severity of plant disease depends on 3 factors, we often put these factors together geometrically to form a triangle. One side representing environment, one the host and the third the pest (fungus). The length of each side representing the risk factor given that side. For example if we have a good crop or "host" then that line is longer. If the pest is prevalent in the area, that line is longer as well. That leaves perhaps the biggest wild card: environment.

When examining the environment we have to not only look at the macro-environment (daily highs, humidity, rainfall), but also on a micro scale. That means looking at what the actual environment is deep inside the plant canopy where disease occurs.

In even a "dry year", crops that are dense, with little to no air flow can build up high levels of humidity. Even hot days can add to this by evaporating moisture from the soil and trapping it inside the canopy. Also consider the possibility of rain in the future and what stage your crop will be when it does.

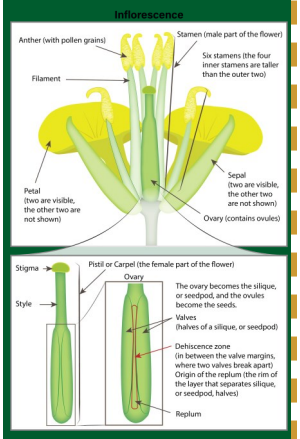
This is where evaluating the "host" comes in. If you have a thin stand with small leaves, air flow can readily reduce the humidity, limiting disease potential.

External factors, outside the disease triangle, must also play a role. The biggest of course is economics. Afterall your paid for bushels, not plant health, and the cost of the fungicide and application reduce the net return.

Each field, soil type, variety and many other factors play a role in the decision to apply a fungicide or not. Don't limit your decision solely on "It's a dry year," take a deeper look.

Excessive Heat and Canola Flowering

Excessive Heat and Canola Flowering



Canola is defined as a "cool season" crop. It was developed in Canada and designed for Canadian climates. It performs best with warm days, cool nights; in fact it thrives in these conditions. Canola is not grown in southern US, like corn and soybeans, for this reason. Canola is also an incredibly dynamic plant and adaptable to changing conditions; "plastic" is often a term used to describe it. Canola has various mechanisms with its biochemistry that allows it to adapt in dry conditions, but heat is another matter, and especially heat at the onset of flowering.

Reproduction is the sole function of a canola plant. By reproducing the plant produces seeds that continue its genetic line. These seeds are what we harvest and sell, producing income for our farms. The most important step in this function is flowering. Canola plants use flowers to transfer pollen from the anthers to the top of the pistol (ovary), where the pollen produces tubes that deliver sperm cells down into the ovule, fertilizing the egg and producing seed. Every single seed requires its own pollen tube. Studies have shown that this process from pollen landing on the pistol to growing a tube down the style, takes only a matter of a few hours. So this is incredibly fast, and conditions have to be perfect. This process is also incredibly complex and controlled by plant hormones. Plant hormones are responsible for directing nutrients required for the pollen tube to grow down the ovary into the ovule. It is also important to remember that a canola plant has the ability to produce way more flowers than it can actually take to seed. In fact studies have shown that a canola plant intentionally only actually produces 60% of what it could potentially do.

So what happens in excessive heat. Studies dating all the way back to the 80's found that temperatures above 29.5C, reduce yield by causing the flower to abort. Producing a "blank", a petiole without a pod or an empty pod. The questions then became why and what can we do to prevent it. The development of hybrid varieties reduced the effects of heat blasting, but did not completely stop it. Studies continued and it was determined that plant hormones produced this effect and in fact they were designed to do just that. See this ability of canola to "blast" a flower under excessive heat is exactly the natural response that that give canola it's "plastic" qualities. Without this ability canola could not rebound form adverse conditions at the on-set of flowering. The plant hormones basically shut down these flowers by shutting off the nutrients to the pollen tubes, and the ovule not being fertilized either dies off or produces an empty pod. So the canola plant saves it potential to when it senses more positive conditions and then still has the reserves to be able to produce the seed then.

So can we somehow manipulate this process to produce excessive heat tolerant varieties? Can we somehow apply a plant hormone to stop the other plant hormones? Can we apply the right nutrient at the right time and place to overcome the blocking by the plant hormones? Well we've been asking these question for over 15 years now. I found an old Alberta Canola webinar from 2011 where we asked these exact questions. Yet no silver bullet has been found. Variety breeding in canola is making strides, however heat tolerance is a complex genetic issue, as is plant hormones. One possibility has been the application of nutrients at the onset of flowering, especially Boron, which is important in pollen tube growth. However rigorous scientific studies has not conclusively shown that Boron will prevent flower blasting all the time. It has however helped some of the time. Given how complex the entire process is maybe some of the time is all we can hope for. That and cooler weather.

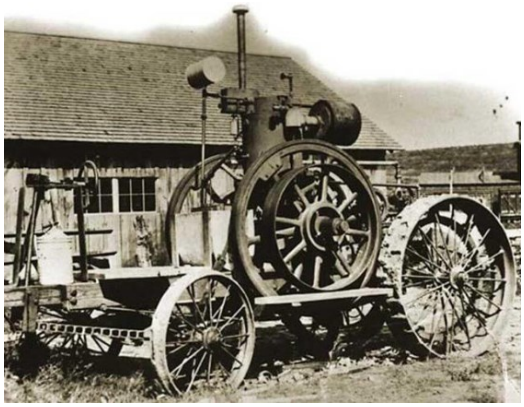
Heat Stressed Flowers

John Froelich

By Courtney Jankowski

Throughout time farmers have relied on different tools to get the job done. Perhaps none more than the trusty tractor. While he didn't create the tractor, in 1892, John Froelich made perhaps the most important upgrade. He made it gas-powered. Today this may not seem too impressive but in 1892, this small change not only greatly improved the tractor's performance it saved lives.

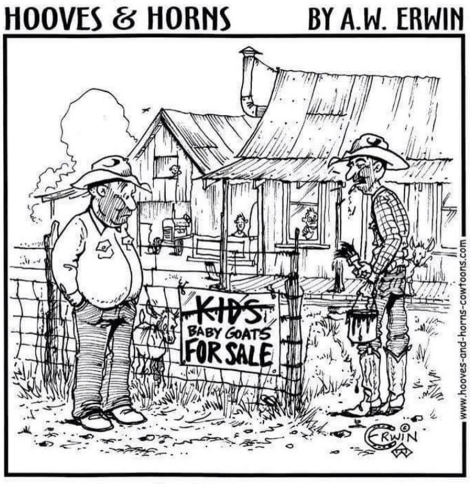
Before Mr. Froelich created the gas-powered tractor, farmers could only use steam-powered engines to plow. These tractors were slow,



leading to difficulties in maneuvering, and prone to explosions. With a gas-powered engine farmers could complete work more efficiently and safer than ever before. It could even go backward, which at the time was unheard of for farm machinery! This new tractor became an instant success and by the late 19th century could be found on almost every farm.

John Froelich

Farming is Fun



"Yeah, my wife said it was *scaring* the children."