Our Journey with ACF SR - The Bohuns

My name is Nicole Bohun. I am part of Sunset Road Seeds in Richard, Saskatchewan, along with my dad, Dennis and brother, Randy.

I graduated from the University of Saskatchewan in 2012 with a Bachelor's of Science in Agriculture Major in Agronomy and Minor in Agribusiness. I came back home to farm with my dad and brother and I looked forward to using my agronomy knowledge on our farm. Unfortunately, my time physically working on our farm was cut short. Due to a distracted semi driver, I was involved in an accident and was left paralyzed.

As Randy continually says, I am the brains behind our change from high rates of regular high salt fertilizer and NH3 combined with multiple fungicide and insecticide passes a year to ACF-SR, low salt granular starter fertilizer with NH3 rates less than half of previous years' rates and low salt foliar fertilizers.

During my time away from working on our farm, I have researched and maintained an understanding of new products and farming methods. This is where our journey with AdvancedAG and ACF-SR began….

Overview of our farm

We are a family farm of 10,500 acres in size, located in Richard, Saskatchewan, with some of our land located 25 miles east at Krydor, Saskatchewan. Our land is a part of the Black/Grey Soil Zone of Saskatchewan. We grow a rotation of canola, wheat, oats, flax, barley and peas. In 2017, we became Sunset Road Seeds - a Pedigree Seed Grower for Canterra Seeds. This has since expanded to now include Alliance Seed and Secan. In December 2021, we became a dealer for Top Krop Fertilizers Ltd. and users of the AdvancedAg product line.

I first spoke with a representative of AdvancedAg in 2017. I had many questions and they were able to give endless answers. However, we were not convinced of the capabilities of their biologicals.

As time went on, we kept thinking of AdvancedAg and ACF-SR through the years. In 2021 drought hit and of course, fertilizer price increased substantially.

I contacted AdvancedAg again in the Summer of 2021. It was nice to see the growth and successes they have had since our first talk. I decided to delve further into research of ACF-SR and presented my findings to my dad and brother on the numerous soil and plant benefits seen on other farms. It was agreed that we would go forward, but as my brother said, “I will have to see it to believe it.”

Why did we decide to use ACF in 2022?

- It was reported that a number of growers using ACF-SR have been able to cut their fertilizer rates by significantly without any adverse effects on yields or quality.

- ACF-SR has been found to help conserve moisture, leading to healthier plants in droughts.
- Many growers have found they have not had to reply on the use of synthetic seed treatments, fungicides or insecticides as much if using ACF-SR.
- ACF SR is proven to increase BRIX (sugar) levels of plants. Higher BRIX levels increase disease and insect resistance, as well as the plants ability to handle stress and increase photosynthesis rates.
- Soils where ACF-SR has been used have been found to have increased nutrient levels.
- The biologicals in ACF-SR work to add nutrients to the soil from the air and plant residues. They unlock nutrient reserves in our soils which are naturally rich in many nutrients found in the parent materials from which our soils are formed. The fact that our soils in the prairie provinces are considered to be young according to soil forming standards (~10,000-17,000 years old), they are not depleted in nutrients.
- Maturity of crops has been found to be sped up 7-10 days.
- Higher test weights have been consistently found in crops where ACF-SR is used.
- High protein levels have been achieved without having to apply high amounts of N fertilizer.

Based on the size of our farm we decided to set up a custom BrewTus to best meet our needs. This included a BrewTus 1000, a 5000 gallon tank for brewing and a 5000 gallon tank for storing brewed ACF SR. We purchased an additional aeration assembly for the storage tank just incase the ACF needed to be fed again.

2022 Growing Season

We grew wheat, canola, barley, flax and oats and after the 2021 drought, we knew zero subsoil moisture was available. The moisture from snow melt and spring rainfall was limited at seeding on most of our land with seeds going into partially wet to completely dry ground.

The moisture conditions on our land at Krydor was pretty good at seeding. The moisture came in mixed amounts throughout the beginning of June with the Krydor land receiving more.
The end of June and all of July saw minimal rain at Richard and good amounts of rain at Krydor. By the middle of July, we saw high temperatures, lasting throughout all of August and into September.

The first week of August we saw a good amount of rain, with Krydor once again receiving more. After that the taps shut off until the beginning of September.

Rainfall totals for the growing season:

- Richard = 4.5”
- Krydor = 8”

Wheat Program

- **Variety:** ACC Connery
- **Seed Treatment:** Straight ACF-SR was applied at a rate of approximately 120 litres per 500bu, 2-2 ½ hours before going to a drill to allow time for seed to dry down.
- **Fertility:** 50lbs/ac of Eleven Superstart (10% with the seed and rest in side band) and 50lbs/ac of NH3 in side band at seeding.
  - 2 gal/ac ACF-SR once plants were up out of the ground
  - 1 gal/ac KS 2075 with herbicide
  - 2 gal/ac of ACF-SR on wheat at Richard at 75 - 100% fully headed out stage.
  - 3 gal/ac of ACF-SR on wheat at Krydor at 100% fully headed out stage.
  - 1 gal/ac of ACF-SR on wheat at Krydor when doing second application on canola there.
    - On 120 acres 1 gal/ac of KS 1022 and ½ L/ac of KS Maximum was applied along with this ACF-SR application.
    - On 157 acres 1 gal/ac of KS 2075 was applied along with this ACF-SR application.
- All in-crop applications of ACF-SR were done with sprayers after 7pm or once the heat of the day passed. Spraying continued all night until approximately 8am when sunlight became more direct on plants. This was done to avoid UV ray damages to ACF-SR.
- 10gal/ac of water was the water rate used to ensure good coverage.

Wheat Results

- Within 6 days after seeding, wheat was popping out of the ground. By 8 days after seeding, wheat seedlings were 1-1.5" tall.
- After the first application of ACF-SR, crop took on a darker green color pointing to an increase in chlorophyll and nitrogen in the plant which in turn points to increased photosynthesis and productivity.

* Important to note is that the fields that were sprayed during or right before a light rain saw the darker green colour change be more distinct and come on quicker.

- Wheat at Richard showed zero disease presence throughout the growing season.
- At herbicide timing leaf blotch was found on some wheat leaves at Krydor where 5 inches had already fallen.
    - Found on old growth only.
    - Plants right next to an infected plant were found to be free of disease.
    - Found only in low areas where more water sat or where canola stubble was high.

- As the growing season was coming to an end, one thing that greatly concerned me was if we would find plants infected with FHB throughout the fields as no fungicide was used. This did not occur.
- Yield:
  - Richard wheat acres which only had 4.5" of rain saw an average yield of 54bu/ac.
  - Krydor wheat acres which had 8" of rain saw an average yield of 87bu/ac.
  - 2021 yield was 13bu/ac.
- Protein levels across all wheat samples ranged from 14.5 – 16.6 with an average of 15.4.
- Test weight: 64.9 – 67.8 lbs/bu
- FHB Levels: 0% FHB on every sample

Canola Program

- Varieties: L340P, CS4000 and CS2600
- Seed Treatment: Helix®Saltro®Fortenza®Advanced
  - Because of seed treatment having properties that can detrimentally harm the ACF-SR, none could applied until 21 days after seeding to allow time for seed treatment life to end.
- Fertility: 65lbs/ac of Eleven Superstart (10% with the seed with remainder in side band) and 50lbs/ac NH3 in the side band.
  - 1gal/ac of KS 2075 with herbicide
  - 3gal/ac ACF-SR at bolting to 10% flowering
    - Canola at Krydor only received ACF-SR in this pass while all canola acres at Richard got 1 gal/ac of KS1022 and ½ L/ac of KS Maximum too.
  - 2gal/ac ACF-SR with 1gal/ac KS 1022 foliar fertilizer at approximately 30-50% flowering
    - Canola acres at Krydor got 1 gal/ac of KS1022 and ½ L/ac of KS Maximum in this pass while all canola acres at Richard just got ACF-SR.
- 10gal/ac of water was the water rate used to ensure good coverage.

Canola Results

- Unfortunately, due to rain events and a couple breakdowns we were unable to get the ACF-SR on our canola as soon as we wanted to, so our reports of differences seen are limited.
- Diamondbacks were an issue for some growers at Richard. They were found in our canola fields, but never reached threshold levels.
    - Bugs that were found in one scouting were gone come the next.
        - The BRIX levels had to be high which is detrimental for insects as they cannot digest plant sugars. The sugars turn into an alcohol in their stomachs which kills them.
- In years previous, as plants were ripening, canola plants infected with sclerotinia could be found in fields even if fungicide was used. This year there were no canola plants infected with sclerotinia.
- Yield:
    - Richard canola acres which received 4.5" of rain yielded 27 – 48bu/ac with an average of 42.
    - Krydor canola acres which received 8" of rain saw the L340 and CS2600 yield 61bu/ac and our CS4000 acres ran 68bu/ac.
    - Canola yields in 2021 ranged from 7-14bu/ac at both locations.
- Test weight: Uncleaned sample of canola from Richard, we are currently hauling out, weighs 51lbs/bu.

Barley Program

- Variety: CDC Fraser
- Seed Treatment: Straight ACF-SR was applied at a rate of approximately 120 litres per 500bu, 2-2 ½ hours before going to a drill to allow time for seed to dry down.
- Fertility: 50lbs/ac of Eleven Superstart (10% with the seed and rest in side band) and 50lbs/ac of NH3 in side band at seeding.
    - 2 gal/ac ACF-SR once plants were up out of the ground
    - 1 gal/ac KS 2075 foliar fertilizer with herbicide
    - 3 gal/ac of ACF-SR when crop was 100% fully headed out.
        - Gave a higher ACF-SR rate this time because of leaf disease found at herbicide timing.
- 10gal/ac of water was the water rate used to ensure good coverage.

Barley Results

- As found with the wheat, the barley was popping out of the ground within 6 days, and after the first ACF-SR application the barley seedlings took on a darker green colour.
- Due to barley's high susceptibility to disease, tan spot was found on the old growth of some barley plants at herbicide timing.
- At second ACF-SR application time, the barley was dark green, clean and knee high.
- Yield:
    - The one quarter of barley which we had this year at Richard yielded 68bu/ac.
    - The last year we had barley was 2015 and that yield was also 68bu/ac. In 2015, we had higher amounts of rain and used high rates of fertilizer.

Flax Program

- Variety: AC Prairie Thunder
- NO seed treatment

- Fertility: 50lbs/ac of Eleven Superstart (10% with the seed and rest in side band) and 50lbs/ac of NH3 in side band at seeding.
    - 2 gal/ac ACF-SR once plants were up out of the ground
    - 1 gal/ac Kugler 2075 foliar fertilizer with wild oat herbicide
    - 2 gal/ac of ACF-SR at flowering
- 10gal/ac of water was the water rate used to ensure good coverage.

Flax Results

- The biologicals worked on the flax as it did on all other crops with darker green colour after application, no disease pressure and the ability to last longer when moisture was limited.
- Yield:
    - With only 4.5" of rain, all the flax acres came off at a yield average of 18bu/ac.
    - 2021 yield was 5bu/ac.

Oats Program

- Variety: CS Camden, CDC Endure and AAC Douglas
- Seed Treatment: Straight ACF-SR was applied at a rate of approximately 120 litres per 500bu for the majority of oats. The final 1500bu though, was made soaking wet. The ACF-SR was applied 2-2 ½ hours before seed going to a drill to allow time for the seed to dry down.
- Fertility: 50lbs/ac of Eleven Superstart (10% with the seed and rest in side band) and 50lbs/ac of NH3 in side band at seeding.
    - 2 gal/ac ACF-SR once plants were up out of the ground
    - 1 gal/ac Kugler 2075 foliar fertilizer with herbicide
    - 2 gal/ac of ACF-SR when crop was 75-100% fully headed out
- 10gal/ac of water was the water rate used to ensure good coverage.

Oats Results

- Within 3 days after seeding, the oats that was treated till soaking wet were already ¼" above ground.
- Seedlings were able to catch up to the neighbour's wheat that was seeded two weeks earlier.
- As with the wheat and barley, the oats turned darker green after the first application of ACF-SR.
- In past years net blotch was a consistent disease we had issues with on our oats, affecting the flag leaf, no matter what fungicide we used. Zero disease was found in our oats this year.
- Yield:
  - With only 4.5" of rain our oats yielded 54-105bu/ac.
  - 2021 yield was 22bu/ac.
- The only test weight results we have at this time is from our high yielding oats which came in weighing 46lbs/bu.

Soil Tests

Over all 15 soil tests this year, we have higher amounts for most nutrients than we did in 2021 even though less fertilizer was applied and our organic matter increased in every field from 2021 to 2022 anywhere for 0.2-1.4 points.

When we started soil sampling some fields in 2018 we started with good nutrient amounts except for phosphorus. The following three years we increased our rate of MAP applied to try to increase phosphorus levels; however, it wasn't until 2022, after using ACF-SR, that we were able to get above 15 ppm for the Bray phosphorus levels in some fields and above 10 ppm Bicarb and Bray phosphorus levels in other fields.

Our sulfur and nitrogen are up and down over all the tests. Sometimes higher, sometimes lower and sometimes relatively the same as levels found in past years.

Our pH evened out more in the neutral, high nutrient availability zone on many fields.

There were generally less soluble salts and ppm of sodium found in all 15 soil tests.

Since 2018 CEC levels kept decreasing on many of the fields sampled until this year's soil tests. At Krydor a CEC increase was seen in both fields sampled this year compared to last year, with the field shown on the previous slide, even surpassing CEC levels seen in 2020 when it was first sampled. There were CEC increases in fields at Richard this year compared to last year as well, but not in all fields.

ACF in Pastures

We also got to see how ACF-SR can work on a severely over grazed pasture with compacted soil.

Animals: 120 head of buffalo including calves and heifers.

- 1st application = 2 gal/ac with 10 gal/ac rate of water for good coverage
- 2nd application = 3 gal/ac with 10 gal/ac rate of water for good coverage

Prior to hearing about ACF-SR, the buffalo producer was intending on letting the pasture go one more year then till it under in the fall to re-seed in hopes of reviving the pasture. Instead, he decided to give the ACF-SR a try to see what it could do, if anything.

After the first application, grass greened up and was a bit thicker than the spot left without ACF-SR for comparison.

It was decided to apply 3 gal/ac in the second application.

With the second application done the producer no longer had to use a paddock system to allow grass to grow back. Animals freely grazed without eating grass to the ground anymore.

The animals would eat, go for water and lay down as they were no longer scrounging for food but felt content with what they were eating. This provided evidence to the ACF-SR being able to increase the nutritional value of plants allowing producers to feed more animals on the same amount of grass.

In years past, when the green feed oats would be available for the buffalo, they would devour it in a short period of time. This year they would actually leave the oats, go back to eat some grass and then lay down.

In September, while neighbouring pastures were dying off, this pasture was still green and growing strong. The producer is glad he found out about ACF-SR. He no longer plans on tilling any parts of the pasture under, and is already planning on applying ACF-SR next year to bring the pasture grasses and soil back to life even more.

Concluding Remarks

All cereals treated with ACF-SR saw quicker emergence compared to emergence seen in previous years when treated with synthetic seed treatment.

In July we stopped foliar fertilizer application on crops at Richard, but did continue with ACF-SR. While other crops were burning up, ours held on longer. From this and the yields we achieved, we can safely say those bugs proved that even though they may stink, they can still work with the plants to help save yield and quality.

At the end of the day, yes yields seen this year have been achieved in the past BUT with drastically higher fertilizer rates (100-160lbs/ac N, 60lbs/ac MAP, 20lbs/ac K & 20lbs/ac S at seeding with 150-200lbs/ac Ammonium Sulphate fines floated in-crop on canola), multiple fungicide applications, foliar fertilizer applications and often insecticide applications as well which meant a lower ROI. **This year we have been able to achieve high yields, build our soils and increase our ROI which is what every farmer wants**.

Was it solely the ACF-SR that gave us the yields? No. Was it solely the low salt fertilizers we used? No. The ACF-SR and low salt fertilizers work together to provide a solid fertility

package to ensure plants are not lacking and can handle stress, without yields or quality being significantly reduced. One cannot go without the other in our opinion.

The benefits obtained through ACF-SR use are not all seen above ground in year one via plant health, yield and quality. While achieving benefits above ground, below ground they are releasing and fixing nutrients, building organic matter and reducing salt amounts which will be seen as benefits above ground in the years to come for long term not just a one time deal.

A huge thank you to the AdvancedAg team. for never hitting reject on my multiple phone calls and texts throughout the growing season. You were always there to help us not to just use your product, but have it work for us.

If you stuck through and read this until the end and have any questions, I would be happy to answer! Give AdvancedAg a call and they will pass on my contact.

- Nicole Bohun


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