Balancing food production and sustainability

Water important asset for modern crop protection

By: Piet Regnerus

It looks like an exciting, edge-of-your-seat kind of job: growing crops in a highly computerized era and driving big AG machinery. But being a farmer is a highly demanding job these days. By 2050 we'll need to feed two billion more people. With this high demand for food, farmers need to double their crop production the coming decades. The fast growing world population expects farmers to produce more—and affordable—food. On the other hand, people want food that is nutritious, without harmful chemical residues, and cultivated by environmentally friendly farming methods. To maximize both crop yields and sustainability at the same time is a huge challenge. With supermarket shelves consistently well-stocked, most people know little about the challenges of food production so the focus is more and more on sustainability rather than on food security. Are we aware of the danger called "food insecurity" lurking around the corner?

"Farmers feed the World", "No farmers, no food" are popular sayings to help bring awareness to people about where their food is coming from. But the origin of their meal, and the difficulties to produce it, is usually unknown. Crop pests equals massive loss in crop productivity—a big challenge for our future World population's need to eat. In a normal year up to forty percent of global crop yields are lost due to pests and diseases. Without pesticides, about half of world's crops would be lost! So, for people to have continuous access to not only enough, but also safe food, we need to strike a balance in using as minimal chemicals as possible while maximizing food production. Securing enough food for global consumption is at this moment impossible without the use of pesticides. Therefore, it is important to implement innovative sustainable crop protection technologies.

Water quality is a key factor

As the rising sun paints the sky over Superior, South Central Nebraska, Luke Meyers and his team are airborne. Luke's aerial AG spraying business consists of a fleet of five planes for crop dusting. At dawn the little yellow planes flying across the fields spray fertilizers and chemicals to secure a healthy crop. Modern technology helps his pilots navigate when they loop, dive, skim and leave the fields. Luke's team is always ready to respond, understanding that moments count when crop health is at a critical turning point. Flying with high-tech equipment and pushing the art and science of sustainable spray application to the limit, it's possible to achieve exceptionally high levels of pest and disease control. *"We search for a more efficient and effective crop protection continuously. Next to high-tech gear, computer technologies and crop protection products, water is a key factor for an excellent and safe spray application",* says Luke.

A few years back when Luke heard about Magnation water treatment technology he was skeptical about the promised effects. But the commitment to continually refine and improve his spray application efficiency became a paradigm shift in the way he looks at the physics of spraying fluids. Luke decided to install a unit for a trial. He was astonished about the results.

"We get much better water quality due to breaking up molecule and mineral clusters in water with the Magnation unit. A big advantage is better mixing of water with the chemicals or fertilizers, which helps us to achieve a higher quality and more efficient spray application. Better water really is helping how chemicals are working together and achieving overall better spray application results while saving costs." Now every plane of Meyers Aerial Service is equipped with a unit for optimizing the effects of spraying.

Cropping successes

As the use of chemicals lies more and more under a magnifying glass, farmers feel the heat and the need to take steps towards more sustainable crop production. Environmental awareness is therefore key in the daily operation of farmer Les Bruntz. Les is from the Holdrege region, Nebraska, which is fairly hostile to farming (hot and dry, and the soils prone to salinity). Yet he is well known for his cropping successes in corn and soy beans. In 2012 on the state-of-the-art technology agricultural machinery show, Husker Harvest Days in Grand Island, Nebraska, he heard for the first time about Magnation Water Technologies. *"Of course I was sceptical. But since we had a lot of water issues on our farm I decided to give it a shot."* After some trials Les was ecstatic about the clear results.

Les uses Magnation devices in every step. *"I am getting a much better kill on resistance weeds. This is the way my system is set up with Magnation units: 1. The first one for the intake water, 2. another one for the mixed chemicals, 3. a final one on the sprayer. I'm convinced that a better solution of water and chemicals is the basis for the strive to optimum crop dusting. The results are amazing!"* According to Les and his neighbours he grows the best soy beans in the area with no weeds!

Try it in fields

On the other side of the Atlantic Ocean, modern sprayers are also equipped with several smart technologies to optimize crop productivity. Farmers in The Netherlands are keen on striving for excellent and environmentally friendly crop protection. For an effective weed control in sugar beets, for example, it is important to spray at an early stage with a well-closed spraying cycle. This allows for the lowest dosage of chemicals. The weed problem on Dutch sandy soils is very high. A farmer who overlooks spraying a few square meters has in no time a hedge of weeds popping up. *"We have a standard weed bag in our soils. If we do not perform optimum weed control for a year, we suffer from it for the next 20 years."* jokes Berend Jansema who manages an arable farm growing starch potatoes, sugar beets and cereals grains in eastern Groningen, The Netherlands. Therefore, weed control is a big focus in his farm operation. *"The story I heard about Magnation's water treatment technology made sense, but I'll only believe it when I see it. If we really want to know the effects of this technique, we just have to try it in fields. Since our industry is more than ever under a magnifying glass, we must seriously consider all possible techniques that contribute to more effective and environmentally-friendly crop protection in order to ensure an adequate pesticide package for the future!"* emphasizes Berend. He decided to mount the Magnation technology on his sprayer.

To find out whether Magnation's technology was useful in his operation, Berend earmarked a field of 20 hectares of sugar beets for a controlled trial. *"At a dosage of 120 liters per hectare, I reduced water and chemicals by 20 percent. I did this the same way during all four*

applications. I can say with conviction that the weed control during the entirety of this trial has been effective. With a savings of 20 percent on our 50-hectares of sugar beets, I am saving of minimum EUR 2,500.00 in pesticide costs. I also cover more hectares which is positive for fields at a longer distance."

Cannot afford mistakes

Someone who champions sustainable practices is fourth generation farmer Bote Terpstra. Bote runs an arable farm with high end seed potatoes as his primary crop. Living in the Northern Netherlands, sea climate is optimal to grow high yield seed potatoes at a relatively low pests and disease pressure. But also in this area disease pressure is increasing. When he heard the story about the effect of magnetizing of spraying liquids Bote was immediately curious. *"Every farmer who hears the word 'savings' will lean forward to listen. For any farm operation, each percent of saving equals profit!"* says Bote. Yet he was sceptical. *"With growing seed potatoes we cannot afford mistakes because of large export interests. But given the public debate on chemical usage for crop protection it is our responsibility to give new ideas rigorous consideration. In order to determine whether the Magnation technology works it needs to be tested under open field conditions."* The decision was made and Bote installed the technology on his self-propelled high-tech Agrifac Condor sprayer. In a plot of 4 hectares of seed potatoes the trial was run with a 5-15 percent reduction of water and pesticides applied.

"We regularly walked through the field of potatoes to monitor crop health. During growing season, we have a weekly cycle of spray application against late blight, aphids and fungi. This growing season was characterized by high disease pressure due to wet conditions. I could not find any deterioration in the plot where I applied a 15 percent lower dosage of magnetized spraying liquid. This test has taught me that we as an industry must continue to look critically at the amount of water and pesticides that we apply."

Extreme weather, due to climate change, makes it difficult for farmers to keep crop health under control. Optimizing application techniques and spraying fluids are critical to achieve effective and efficient crop protection. The average farmer quickly saves money even with 10% less pesticide use. *"With the acreage we cultivate I can save a minimum of EUR 10,000.00 per year. With this amount of savings, the investment is easily covered within a growing season. In addition, the savings comes back every year!"* smiles Bote.

As each farmer chooses their own approach for controlling weeds, pests and diseases, it is clear that sustainable crop protection has paramount priority in the AG sector. Applying Magnation's technology to spraying fluids can contribute to more effective crop protection, lower environmental impact and put more money back in the farmer's wallet. One thing is for sure: water is one piece of the larger sustainable crop protection puzzle.