BATTLE RIVER IMPLEMENTS LTD.

AGRONOMY UPDATE

DECEMBER 2020

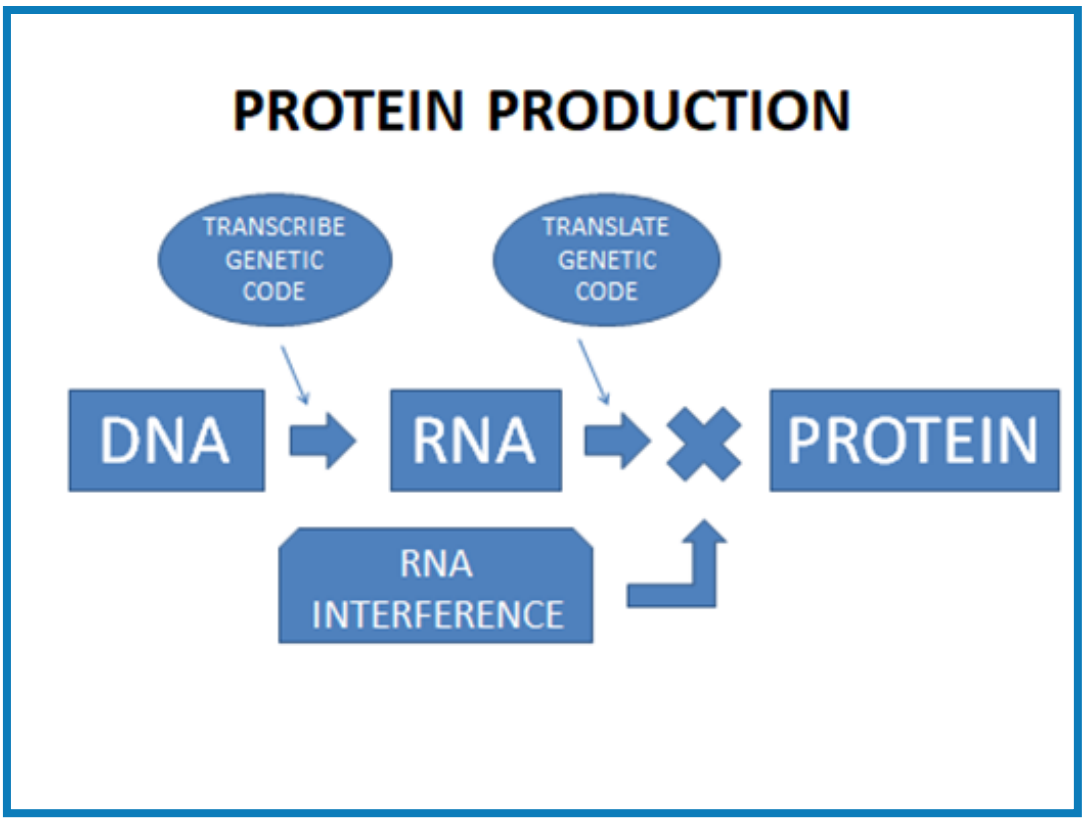
OF PESTICIDES

There may be help on the way

THE NEXT GENERATION OF PESTICIDES?

In-season control of weeds, insects and diseases is an ongoing battle for every producer. And every year, it seems like the list of effective pesticides gets smaller as resistance and regulatory issues take tools away. At the same time, it has been decades since the chemical industry has brought a product to the market that has a new mode of action.

However, there may be help on the way. Professor Mark Belmonte from the University of Manitoba has been working on developing pest management tools focusing on biotechnology, and his initial findings are quite promising. What Dr. Belmonte has been able to do in laboratory experiments is to use genetic mapping to develop something he calls *species specific molecular pesticides.* Working with both an insect (flea beetles) and a fungal disease (sclerotinia), he has been able to isolate DNA sequences that are unique to each of these species and disrupt the target's ability to produce proteins by using something called RNA interference.



THE RNA INTERFERENCE MOLECULE

The RNA interference (RNAi) molecule stops the target species from producing proteins that it needs to survive, while being extremely safe for non-target species. For example, the compound being used for flea beetles is completely safe for use around honey bees and other pollinators. RNAi can be readily produced to work on either single gene sites or on multiple genes. It also promises to be flexible enough to react to any resistance buildup in the population as DNA sequencing of resistant biotypes will also reveal further species specific targets that should still be effective.

Dr. Belmonte is developing both transgenic and foliarly applied options for his new pesticides. The GMO version would have the advantage of season long protection, but would face extra regulatory hurdles plus the issue of acceptance by the public. The foliar option would be easy to apply across multiple crops affected by the target pest, but would likely be costlier, as it may require multiple applications. It would also have to undergo extensive studies to develop a formulation that would maximize the compounds ability to remain on the crop's plant surface and/or penetrate the leaf's waxy layer to extend protection under a variety of environmental conditions.

Initial studies on flea beetles show that both transgenic and foliar options reduce flea beetle populations by about 70% and both options were able to keep canola damage below 25% leaf loss, making the additional application of an insecticide unnecessary.

No data was provided on sclerotinia, but they are working with 3 different compounds, which all showed visible (although variable) reduction in infection rates and the team at the University of Manitoba seemed equally excited about the potential for real control of sclerotinia in canola in the near future.

In 2021, the plan is to take this technology out of the lab and start doing field trials on both flea beetles and sclerotinia where they can do real life studies on foliar formulations and ensure safety to off target species. While you can see that the level of control may not be the 90% + range that we have come to expect with synthetic pesticides, this technology looks like it may be transferable to any number of pest problems that are causing us issues and may offer us sustainable and environmentally friendly agronomic management options in the years to come.

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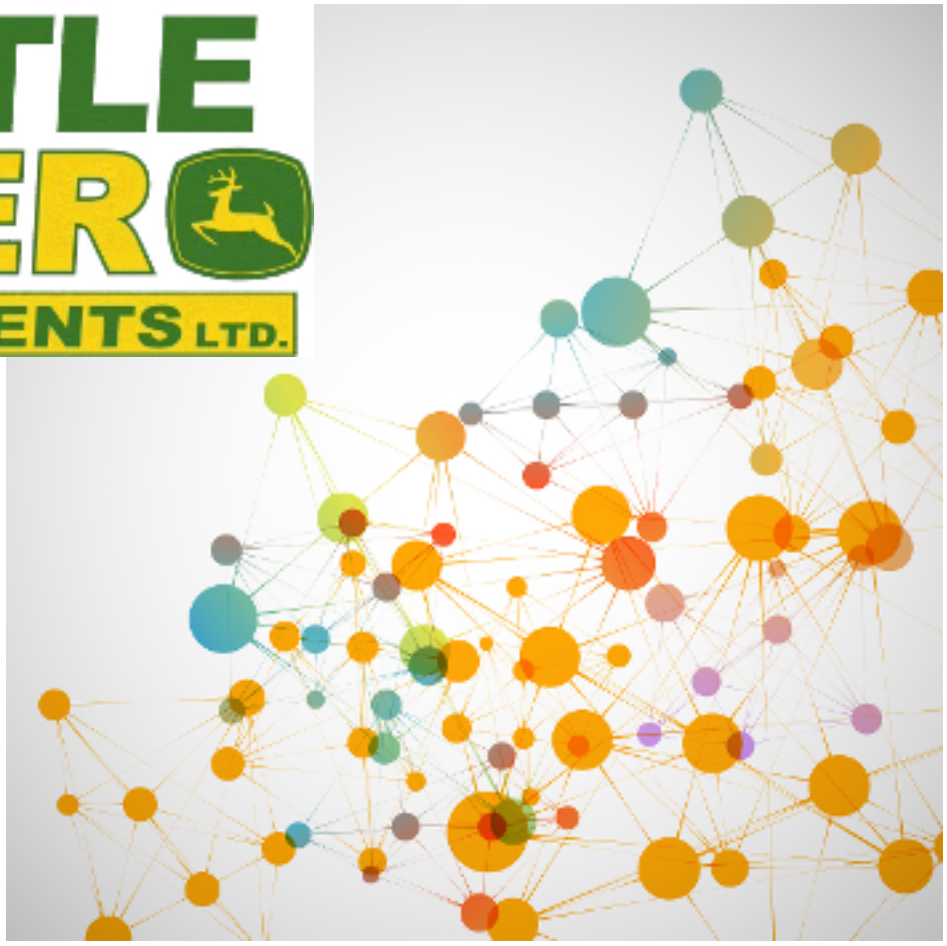

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