TECH BULLETIN 5

EDITION 5 - May 2019
Technical Services, Syngenta South Africa

syngenta®

Stand Strong with Syngenta this wheat season

by Andreas Boon

The fifth edition of the TECH BULLETIN is packed with interesting information focussing mainly on cereals. We discuss control solutions for Diamondback Moths in canola, methods how to tackle your lodging issues in barley and a new solution how to control your *Pythium* root rot issues in wheat and barley.

We wish that everyone involved in the 2019 winter cereal season will experience a successful and productive one!

In this issue

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1 The Diamondback Moth solution in canola

By Tia Ferreira, Technical Lead Insect Control

The diamondback moth, *Plutella xylostella*, is the main insect problem in canola worldwide. It occurs from July to September in the Western Cape area.

It is a small moth with a diamond pattern on the closed wings. The light green larvae make feeding holes in the leaves (Figure 1). Feeding on pods cause damage to the surface only, but the damaged pods then tend to shatter easy. Moths are detected from the end of the stem elongation period, onwards.

Diamondback moth in canola

If canola is planted in areas where other cabbage type crops are also planted, the problem could be more threatening. Larvae of the diamondback moth cause the most plant damage. The larvae are often heavily underrated and they cause more damage than anticipated. Upon hatching, young larvae first burrow between the upper and lower leaf surfaces creating "mines." These result in "windowpane" tunnels and scars upon the leaves. As larvae grow, they begin to feed through larger areas of the leaf creating small irregular holes. Usually leaf damage by larval feeding is cosmetic and only results in minor yield reductions. Occasionally, high populations can lead to entire leaves being eaten, total plant defoliation, and possibly loss of plant stand. The severity of the problem differs from area to area and from season to season. It has the ability to develop into a serious problem in the Western Cape and therefore control is important. They can also feed on weeds like wild mustard and can migrate over long distances.

The insect can develop resistance to insecticides and alternating with chemicals from different mode of action groups, is advised. The larvae cause the most damage in warm dry seasons. When there is rainfall of 5mm to 8mm in a 24-hour period, it does have the ability to lower the population dramatically. In early winter, numbers are low and gradually increase as the season progresses and the diamondback moth can go through three to five generations per season.

Figure 1. From top to bottom: Diamond back adult moth (top), larva (middle) and pupa (bottom). Photos: H. Terblanche

AMPLIGO® has a quick knock-down effect combined with residual action. It contains two complimentary active ingredients namely chlorantraniliprole and lambda-cyhalothrin. As a result of the complimentary effect of the two active ingredients all the development stages of the diamondback moth are controlled. This includes eggs that come in contact with the product, the larval stages as well as the adults. The winter in the Western Cape is very wet and rainy and therefore AMPLIGO® is the perfect solution as it is extremely rainfast. AMPLIGO® showed excellent rainfastness in trials where up to 30mm of simulated rainfall was applied one hour after application.

AMPLIGO® is formulated as a unique and uniform micro capsule (Figure 2.). This technology stabilises the product in the spray tank, gives better coverage, protects against degradation by sunlight and therefore leads to longer residual activity.

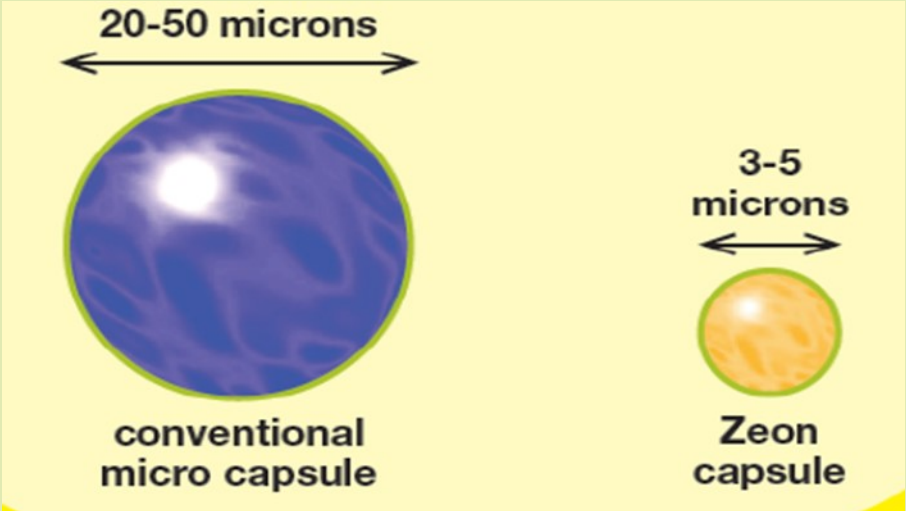

Figure 2. The size of the conventional micro capsule compared to the Zeon capsule of AMPLIGO®.

2 Reduce your lodging nightmares in barley with MODDUS®

By Francoise Viljoen, Technical Lead Weed Control

In 2018, many hectares of cereals had been affected by strong south easterly wind conditions which occurred the evening of 29th October 2018. This was just before harvest and the wind damage caused many crops to fall over in the Western Cape, significantly reducing expected yields in many areas.

Syngenta recently received a label extension of MODDUS® in barley, a plant growth regulator to help reduce the effects of lodging under adverse weather conditions. MODDUS® is mainly applied to prevent lodging by reducing the height of the plants. This is achieved mainly through the shortening of the internodes of the plant (Figure 1).

However, in dryer conditions, trials have shown that plants treated with MODDUS® had additional physiological benefits. Due to the mode of action of MODDUS®, treated plants have a much more developed and increased root mass (Figure 2), allowing plants to use water and nutrients much more efficiently.

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Figure 1: Experiment showing untreated (left) vs treated barley (right) haulms with MODDUS®. The internodes are visibly shorter in the MODDUS® treated plants as indicated by the internode position in barley (Photo: Larissa van den Vyfer).

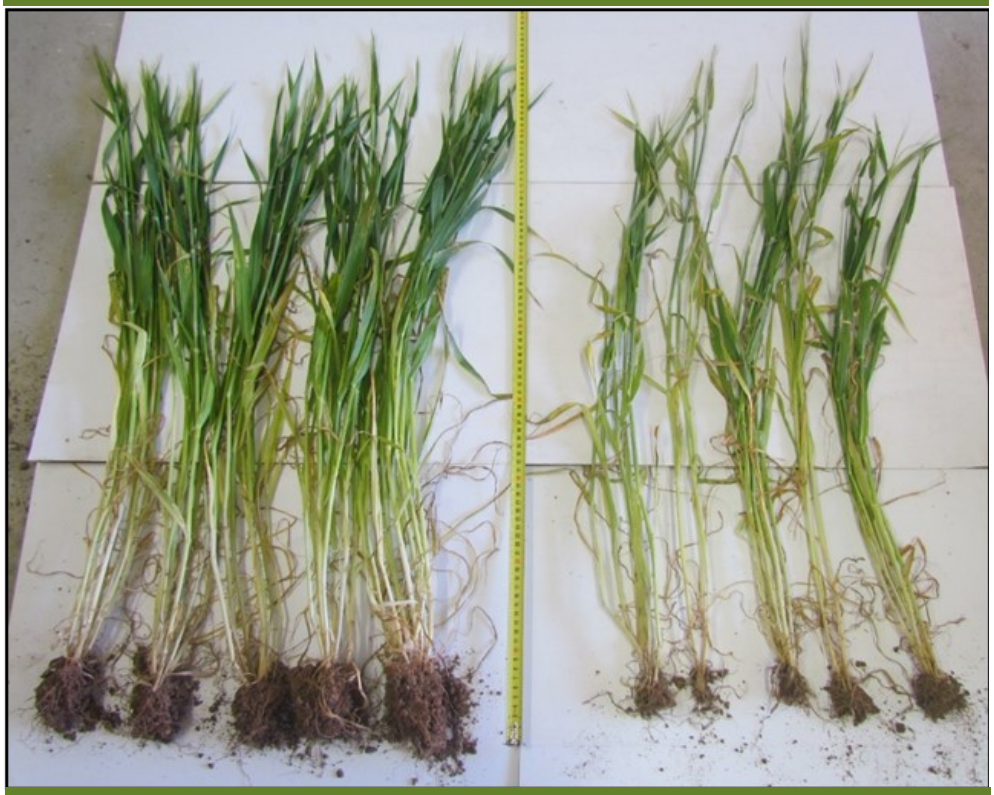

Figure 2: Untreated plants on the right compared to plants treated with MODDUS® on the left (Photo: Larissa van den Vyfer).

MODDUS® is more than a plant growth regulator. It promotes yield through modified crop physiology, improves water and nutrient use and is proactive against weather induced lodging.

This was backed by previous studies that indicated how MODDUS® treated plants used 480ml of water to produce 155g of grain compared to the industry standard which needed 540ml of water to only produce 126g of grain. MODDUS® produced more grain and consumed less water because the water usage is more efficient. An increased root mass further prevents lodging by anchoring the base of the treated plants.

Treatment with MODDUS® have also shown to increase yield of barley crops. Other than reducing lodging that allow more plants to be harvested, the physiological effect of MODDUS® on barley increases the tiller amounts which subsequently increases the total yield. Therefore treatment of barley with MODDUS® allows for higher yield in both dry and irrigated conditions as treated plants uses water and nutrient more efficiently during dry periods.

Application timing of MODDUS® is very important. MODDUS® acts on the Gibberellin acid biosynthesis pathway. This process is mainly active in cereals from tillering (GS20-GS9) up to booting (GS40-49). For best results, MODDUS® should be applied to actively growing plants at the beginning of stem elongation when the second node is detectable on the main tiller or when the flag leaf is just visible. MODDUS® can be tanked mixed with most Syngenta products, as specified on the labels.

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3 *Pythium* root rot of wheat and barley

By Adri Anthonissen Technical Lead Disease Control; Syngenta South Africa and Christian Giesel, Campaign Lead Cereals; Syngenta South Africa

The four most common root rot diseases in wheat and barley are *Pythium* root rot, *Rhizoctonia* root rot, *Fusarium* root- and crown rot and Take All (caused *by Gaeumannomyces graminis*). All of these diseases are caused by fungi that live in the soil. One of the most commonly found organisms is *Pythium* root rot.

Pythium root rot of wheat and barley is caused by several species of *Pythium* and occurs in most wheat and barley growing areas, but is often miss-diagnosed. This fungus belongs to a group of fungi known as the oomycetes and is common in all cultivated soils. The fungus can live in the soil on crop debri or as hardy oospores for a long time. Once a suitable host plant as well as adequate moisture and climate is present, the oospores become active and produce zoospores that will infect plant tissue. *Pythium* spp. has a preference to juvenile tissue and hardly ever causes decay of mature plants.

Pythium spp. infect the very young wheat and barley germinating seed and uses the sugars stored in the endosperm as food source, thus weakening the seedling. This infection can lead to the stunting or destruction of the seedlings (www.apsnet.org/publications, Phyto77n08_1192).

Because this infection take place at a very early stage, it is not always recognised. Poor germination and emergence can be attributed to other causes such as poor quality seed or other soil-borne disease such as *Rhizoctonia* spp. or *Fusarium* spp.

Infected seedlings have a much reduced root system and this can have a negative effect on water and nutrient uptake and eventually reduce yield and seedling die off. It is also favoured by cool moist weather conditions.

One of the best ways to achieve this early protection is by treating the seed with a seed treatment product that will prevent infection of the germinating seed and protect the emerging seedling for a period thereafter and producing a strong an healthy root system (figure 1).

Compounds such as mefenoxam are specifically formulated to control oomycete fungi and are effective in preventing infection by *Pythium* spp. The Syngenta product, DIVIDEND® EXTREME contains two active ingredients (23g/L mefenoxam and 92g/L difenoconazole) which provides wide spectrum protection, not just from *Pythium* spp., but several other soil- and seed-borne pathogens and diseases. Mefenoxam is highly systemic and will be absorbed by the germinating seed to provide protection of the young seedling in sandy and clay soils (figures 2 and 3). The best action to take against *Pythium* root rot is preventative action and this can be achieved by using a reliable seed treatment such as DIVIDEND® EXTREME .

In figure 4, we observe the growth of a soil pathogen isolate on a petri dish (control 2), as well as untreated seed with the pathogen (control 1). T1 – T3 represents seed treated with DIVIDEND® EXTREME at recommended rate in the presence of the pathogen. T1-3 is 5 days post pathogen inoculation of the petri dish. The growth inhibition by DIVIDEND® EXTREME on treated seed in clearly illustrated by the clear zones around the treated seed.

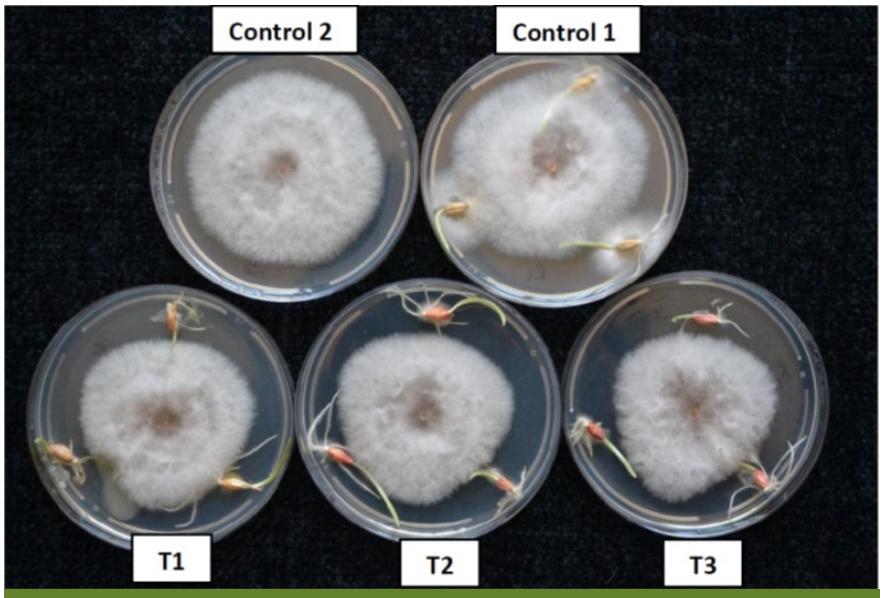


Figure 4: Control 2 is a soil pathogen isolate. Control 1 has untreated barley seed added. T1, T2 and T3 illustrate the effect of DIVIDEND® EXTREME treatment on seed at rate of 66ml/100kg seed. Photo from Syngenta Crop Protection Development Division.

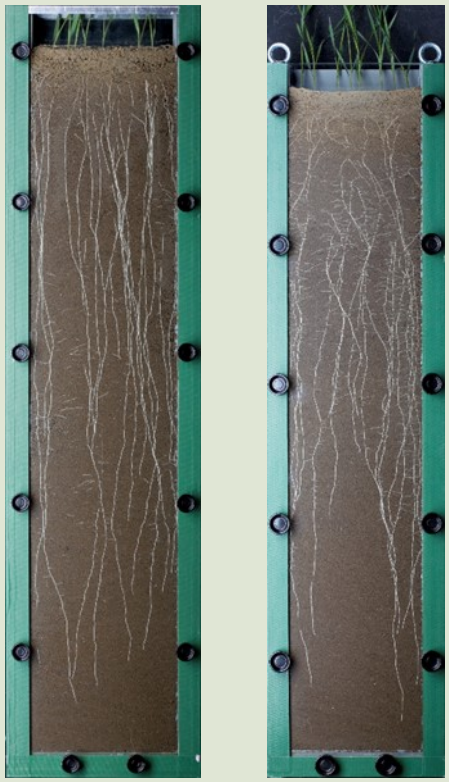


Figure 1: The root systems development of seedtreated wheat (right) and barley (left) seed.

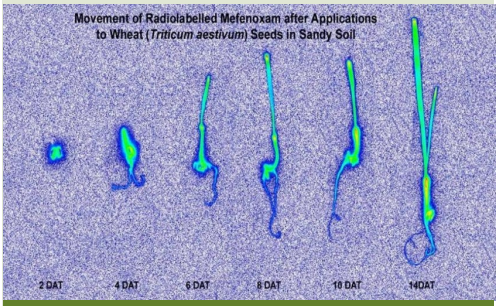
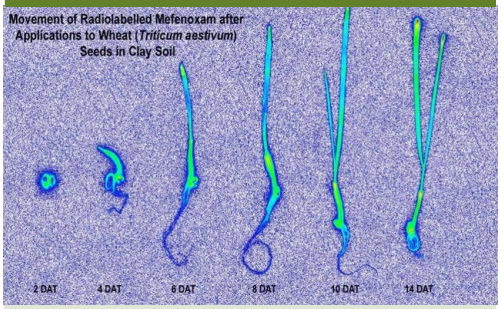


Figure 2 and 3: The systemic action of DIVIDEND® EXTREME during seed germination and seedling development. Photo from Syngenta Biokinetic Division.



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