

The law of attraction

“It’s an enabling technology rather than a straight solution.”

PROFESSOR TOM POPE

A new beneficial insect attractant is promising to bolster the IPM toolbox to help growers combat aphids and therefore reduce the threat of the viruses they can transmit. *CPM* learns about *Apthena*.

By Janine Adamson

Instead of developing a product to directly control insect pests such as aphids, a new concept is aiming to achieve the same results, but by making the most of what already exists in nature.

The solution – a beneficial insect attractant – flips the concept of control on its head. Rather than being a new ‘icide’, or even a biological equivalent, it works by manipulating the behaviour of natural enemies, helping to entice them into the crop earlier.

Launched by BASF, *Apthena* contains the organic signalling compound (E)- β -farnesene (EBF) – an alarm pheromone used by aphids that also attracts beneficial predators and parasitoids, including ladybirds, lacewings and some parasitic wasps.

“EBF was first discovered in the 1970s,” explains BASF’s Rob Storer. “It operates between aphids, between the aphid and the plant, or between the aphid and its predators.”

At a basic level, EBF signals danger,

prompting aphids to flee or stop feeding. It also acts as a semiochemical kairomone where EBF is released by aphids but instead attracts natural enemies. “Because beneficials can use this to their advantage, exploring EBF as a kairomone has been our primary interest,” adds Rob.

However, while Mother Nature can easily apply the benefits of EBF, recreating this as a practical solution for on-farm use was a different matter, notes Rob. “EBF is a volatile compound and degrades rapidly, meaning we had to find a successful delivery mechanism.

“So what makes *Apthena* unique is its proprietary formulation – it’s been developed using microencapsulation technology for controlled release over 20-30 days. By encapsulating EBF in its vapour phase, it’s then released into the air by diffusion,” he explains.

Initial field trials suggest in sugar beet, *Apthena* can reduce the presence of aphids by more than half (from 2% to 0.5%). Then in peas, the product



Compatibility

Compatible IPM tools are those that deliver the best outcome for a profitable crop while posing the least impact on the environment, says Harper Adams University’s Professor Tom Pope.

increased the quantity of plants containing beneficial insects by 18%.

Equally, in controlled laboratory conditions, ladybirds exhibited a significant preference for air containing *Apthena* – opting to move toward the source of this odour more frequently than for the controls.

Harper Adams University’s Professor Tom Pope believes *Apthena* has the potential to either draw natural enemies into a crop early, or, encourage them to

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Casting the net for dual protection

An innovative leaf protection coating is not only minimising disease penetration, but also helping to reduce drought stress

Among the many challenges facing modern day crop production, minimising disease threats and reducing the impact of drought conditions remain among the most pressing. However, could the answer to both lie in one innovative technology, specifically, cellulose nanofibre?

Suggested to be the world's most advanced biomass material, cellulose nanofibre is derived from plant-based pulp. It's also the primary component of Nanomesh – a leaf protectant that when applied to a crop, forms a micro-structured network that acts like a fine net.

This physical barrier helps to limit fungal penetration into the crop, while moderating transpiration out of the plant leaf.

The product is part of



A physical barrier

Nanomesh reduces vulnerability at the plant's infection points, while also protecting against transpiration that occurs through the stomata of the plant leaf, explains Agrovista's Chris Martin.

Agrovista's innovation range, highlights the firm's Chris Martin. He says by using Nanomesh, growers can achieve a two-fold outcome. "It reduces vulnerability at the plant's infection points, while also protecting against the transpiration that occurs through the stomata of the plant leaf," explains Chris.

"Together, this can support overall leaf condition and crop resilience, particularly when used alongside conventional plant protection products. The aim is to maintain a healthy, functioning leaf area during key growth stages."

When demonstrated at Agrovista's Lampport AgX site this year – which experienced drought conditions like much of the country – Chris says plots treated with Nanomesh remained greener for longer, despite the lack of moisture.

Critically, rather than coat the leaf surface entirely, Nanomesh is breathable and transparent, allowing standard plant processes such as photosynthesis and gas exchange to take place.

Recognising the unique properties of cellulose nanofibre led Marubeni – Agrovista's parent company – to work alongside Chuetsu Pulp and Paper and Tsukuba University in Japan to further understand its application within crop production, and ultimately develop



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Innovation for
your growth

► Nanomesh, explains Tomomi Otsuka.

“The product is manufactured by a Japanese producer using a proprietary process. During this, pulp suspensions are collided with each other at high speed through opposing nozzles, mechanically fibrillating the fibres down to the nanoscale. This defibration method is achieved without chemical additives or chemical modification,” he explains.

According to Tomomi, because these nanofibres are produced from naturally-derived raw materials, this aligns perfectly for applications in areas such as cosmetics and agriculture. “It was through

plant-application trials and other evaluations that their true potential for agricultural use was identified, and the underlying mechanism was subsequently investigated through collaborative research with universities and research institutions.

“In the UK, agriculture is facing a changing environment driven by factors such as increasingly irregular rainfall patterns associated with climate change, soil degradation, and tighter fertiliser regulations. As such, we believe Nanomesh has the potential to contribute to yield improvements in crops such as wheat, barley, and oilseed rape,” he concludes.

► remain in the area for longer. However, it shouldn't be used in isolation. “We have to make intelligent selections of compatible IPM tools – those that deliver the best outcome for a profitable crop while posing the least impact on the environment,” he says.

“Aphena can't provide crop protection alone, but used alongside other methods such as wildflower margins and buffer strip habitats, can attract more beneficial insects into the crop at a potentially earlier time than they'd ordinarily migrate. It's an enabling technology rather than a straight solution,” stresses Tom.

According to Rob, Aphena should perform particularly well in scenarios where there are already high levels of beneficial insects. “Then it's a case of manipulating their behaviour with EBF, which should then help to suppress aphid populations.”

With this in mind, the product should be applied when natural enemies are already present and active. Equally, growers should be mindful if using non-selective insecticides in the rotation.

In the main, Rob believes the main barrier to its success will be grower acceptance. “It fits across all cropping systems, but the biggest challenge will be the willingness to adopt the technology on-farm. It's likely the protected horticultural sector will be its initial breakthrough, as these growers purposefully release mass-reared populations of beneficials so have an instant use case.”

BASF recommends applying Aphena at intervals of 14 days at 0.3-0.5 l/ha with water rates of 100-300 l/ha. It's rainfast within 24 hours, requires no buffer zone or maximum application limit, and so should prove a flexible addition for existing IPM strategies, concludes Rob. ●



Optimising populations

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