

# 40 years of Betanal

## Gaining the advantage through innovation



Milestones in Betanal-research



Forty years ago, the then new product Betanal® entered the market. In the intervening years, Bayer CropScience has been steadily optimising this post-emergence-herbicide for sugar beet cultivation through the advantages of Beta Technologies™.

**S**ugar beet cultivation used to be an onerous task. The plants had to be singled-out by hand in order to obtain the best density from an agronomic point of view. And until a few decades ago, weed control was done exclusively by mechanical means; workers had to go through the field several times during a growing season in order to keep it free of weeds. In many cases, the entire family would be kept busy doing this hard work for days on end. Moreover, the beet plants themselves were often damaged during these operations.

It took a long time to find a selective herbicide that did not damage the particularly sensitive beet plants. So it was almost a sensation when Betanal came onto the market in 1968, for this was the first herbicide to make post-emergence control of weeds possible without affecting the sugar beet crop. The *Beta* part of the name was a reference to the plant that needed protection, *Beta vulgaris*; the *nal* part was simply an abbreviation of the German-language name for the timing of treatment: *Nachauflauf* (= post-emergence).

The two to three applications per season were now enough to keep the major part of the weed threat reliably at bay. Betanal initially entered the markets in Germany, France and Japan, but it later became the generally accepted standard for weed control in sugar beet around the world.

### Steady flow of improvements

Since its introduction in 1968, the product has undergone many rounds of improvement in terms of its properties and the possibilities it offers. Over the years, Bayer CropScience Development scientists have been able to create a family of Betanal-containing ready mixtures, thus providing beet growers with customized solutions for their weed problems. Today, Betanal products are on the market in more than 40 countries – in other words, wherever the cultivation of sugar beet is of economic importance.

Through all the improvements that have been introduced, phenmedipham, the active substance in the pioneer product of 1968, has remained an important component of the mixture. “In all this time, there has not been a single observation of resistance to this active substance”, comments Jaroslava Govorovska, Global Product Manager for Betanal at Bayer CropScience. “Indeed, this also applies to desmedipham and ethofumesate – the other two important Bayer CropScience active substances that have been used in Betanal mixtures over the years.”

The most important product in most countries these days is Betanal Expert, a combination of all three active substances, i.e. phenmedipham, desmedipham and ethofumesate. Govorovska continues: “This combination has been brought together in a high-quality formulation, which provides for ease-of-use and reliable weed control, whilst at the same time ensuring excellent compatibility with the beet crop.”

## Formulation in focus

The formulation has been a central theme in the story of Betanal's continuing development. "An herbicidal active substance such as phenmedipham can only express its full activity if it is delivered in a well-tested formulation", says Govorovska. "Efficacy gains within the Betanal product range have often been the result of innovative formulation concepts." For example, one milestone was the introduction in 1996 of Betanal Progress OF, a plant-oil based formulation that improved the distribution of the active substance on the leaf surface, thereby allowing an increase in efficacy to be achieved at a lower application rate.

Development work in the area of post-emergence herbicides in sugar beet cultivation, which is now entering its fifth decade, has also got a name: *Beta Technologies™ – Competence in Beets and Weeds*. On the basis of this competence, Bayer continues to develop new sugar beet herbicides for optimized weed-control that offer flexibility in terms of mixtures and usage, and possess an excellent environmental profile. In 2002, Bayer CropScience brought the newest product onto the market: Betanal Expert. This was the first example of the

use of the so-called *advanced micro-droplet* technology, which brings a further increase in efficacy. The technology ensures that small droplets containing dissolved active substance develop within the spray emulsion; these subsequently become very finely distributed on the leaf. "This results in a particularly good, even distribution of the active substance on the target weeds, and thus optimal uptake by these plants", explains Dr. Gerhard Johann, the Product Development Manager responsible for the technical development of sugar beet herbicides at Bayer CropScience.

The steady process of improvement means that Betanal Expert is markedly more efficient than its predecessors. These days, only 900 grammes of product need to be applied per hectare within a season. That's less than half the amount of active substance needed in 1968. Despite the reduced application rate, weed control is excellent – with a typical average efficacy against target weeds of 95 percent control (in 1968, the figure was around 65 percent).

But it isn't just the efficacy that has been improved over the years. Development scientists have always paid particular



Jaroslava Govorovska, Global Product Manager for Betanal at Bayer CropScience, moderated the Future of Sugar Beet Forum in Berlin.





More than 200 sugar beet specialists from 18 countries met at the Future of Sugar Beet Forum in the Bayer Schering Pharma buildings in Berlin at the beginning of November. This is where the first market launch of the beet herbicide Betanal was announced 40 years ago. Bayer CropScience marked the occasion by inviting the delegates to come to the Forum to discuss utilization, marketing and future perspectives of sugar beet and its products with the experts.



Following a continuing series of improvements over the years, Betanal Expert is more efficient than its predecessors: today, 900 grammes of active substance per hectare are sufficient to control 95 percent of the weed population. In 1968, more than double this amount of active substance was needed to achieve a mere 65 percent control.

attention to the quality of the formulation. And they've achieved a great deal as a result: "The formulation scientist's worst nightmare is when the active substance crystallizes out – but we've had this particular problem under control for years now", notes Dr. Frank Sixl of Bayer CropScience's Formulation Technology Department, who works on the further development of Betanal. Premature crystallizing-out of active substance from the spray solution increases costs and wastes time for the user: sieves within the spray equipment become blocked, meaning a greater cleaning effort. And most importantly, the efficacy of the application is also reduced. This constant process of product optimization has helped Bayer CropScience to maintain its position as global market leader in the sugar beet post-emergence herbicide sector since 1968. "Sugar beet growers associate the name Betanal with a product that continues to be developed, meaning that Bayer CropScience's latest technologies can be implemented to solve their current weed-control problems", states Jaroslava Govorovska. In order to keep this success story going, the Betanal-Team is already working on the next generation of products. ■

Karl Hübner