

A crop protection researcher with long-term success: Dr. Reiner Fischer

**“Endurance is the key
to achieving your goal”**



Researchers who remain true to a subject their whole life are an exception these days, but chemist Dr. Reiner Fischer is one of the loyal types. Since 1987, his name has been inseparably linked to the substance class of ketoenols, the basis of a number of highly effective and environmentally compatible insecticides and acaricides from Bayer CropScience.

Dr. Reiner Fischer is a chemist who loves nature. He gives much thought to maintaining the ecological balance, and through his work makes an active contribution to preserving a rich environment for upcoming generations. As a crop protection researcher at Bayer CropScience in Monheim, Germany, he has been concentrating for years on the development of active substances to control insect pests. "Our goal is to develop products that harm neither users nor the environment, but are still highly effective against pests," he explains, defining one of the motivating factors behind his research. "It's a good feeling to be able to develop environmentally friendly products."

The words sound modest, like everything Reiner Fischer says about himself and his work. He downplays his role, frequently says "we" instead of "I", and emphasizes the scientific facts and figures. In fact, he has every reason to be proud of his research achievements, because he is one of the most distinguished inventors in the Bayer Group. In recognition of his work, he received the Otto Bayer Medal in 2004, an award given by Bayer to honor researchers from its own ranks who have done a great service to the organization through their outstanding inventions. Fischer and his team

discovered and developed an entirely new substance class to combat insect pests called cyclic ketoenols. They are the primary component in a number of successful, highly effective crop protection agents from Bayer CropScience, including Envidor®, a formulation that protects grapevines and fruit trees from spider mites, Oberon®, an environmentally certified insecticide for combating whiteflies in vegetable and cotton farming, and Movento®, a more recent addition to this class of crop protection agents. An innovative product from Fischer's lab, Movento® acts against aphids and other sucking pest insects, such as scale insects and mealybugs.

First experiments in the cellar of the family home

When Reiner Fischer, now 51, recalls his childhood in Germany's Lower Rhine region, completely different images spring to mind, such as his first encounter with crop protection agents while working on his uncle's farm to improve his allowance. "In the 1960s, farmers used to dress cereal seed with mercury compounds to protect against fungi and harmful insects," he remembers. Fischer himself would stand right next to the seed dresser, only to learn a

little while later in chemistry class that "it wasn't exactly safe."

Reiner Fischer discovered his passion for the natural sciences in his youth, daring to perform his first experiments in the cellar of the family home. "My father thought it would be better for me to work in the attic, because if it came to the worst, I would only blow up the roof and not the entire house!" Fortunately, his tinkering never resulted in an explosion, probably because Fischer even then only took action after acquiring a thorough understanding of the theory behind an experiment.

"Active substance chemistry is always a question and answer game.

Crop protection expert by conviction: 51-year-old Dr. Reiner Fischer is one of Bayer's most outstanding scientists. He discovered his interest in the natural sciences while still a boy. His experiences in crop protection at that time motivated him to develop new, less toxic and more environmentally friendly active ingredients.





"You can't achieve anything without teamwork," says Fischer, shown here with his current laboratory team (photo left, from left: Klaus Schwarz, Alexandra Effenberger, Dr. Reiner Fischer, Uwe Chalupka). In a team comprising numerous colleagues, Fischer also discovered the cyclic ketoenols, a new class of active ingredient on the basis of which Bayer's scientists developed a substance that can be used to effectively control spider mites yet is harmless to their natural enemies, users and crops. Dr. Reiner Fischer (photo above right, right) talks shop with his colleague Dr. Udo Reckmann.

Can my ideas be implemented in practice? Do the results correspond to my expectations? If not, why not? What other path might lead to my goal? These are the questions that must be answered repeatedly in active substance research," he explains. Fischer has remained true to this approach even as the demands increased over the years. He began studying chemistry at Münster University in 1976 and finished seven years later with a PhD. After securing an employment contract with Bayer, he worked for another year at Hanover University before launching his career as a crop protection researcher in 1985, working at Bayer's Central Research department in Leverkusen.

One of Reiner Fischer's very first responsibilities pointed him in the direction he still is heading today, albeit not by a direct route. He was given the job of synthesizing new active substances to fight broadleaf weeds. The basic components with which Fischer experimented were known substances. He altered the molecular structure by replacing a nitrogen atom with a carbon atom, and the result was right on target: Reiner Fischer had synthesized his first tetramic acid, used later in compounds that would prove to be powerful insecticides. "Altering the molecular structure fundamentally changed the mechanism of action," Fischer says. Intense biochemical studies followed,

ending in the discovery of a new substance class: ACCase inhibitors, which block an important enzyme in the fatty acid metabolism of target insects.

New active ingredient class to combat spider mites

However, further tests intended to show the potential of this new class led to the real surprise: the new substance was effective against spider mites. These tiny creatures can destroy entire harvests in next to no time and are difficult to control. Reiner Fischer, who had since been appointed project manager for cyclic ketoenols, was given the green light to develop an active substance specifically for spider mite control. It was a mammoth task and posed a new challenge for Fischer and his team.

"Endurance is the key to achieving your goal, not to mention the ability to cope with setbacks," says the chemist of a lesson he had to learn more than once in subsequent years. Virtually every new idea for optimizing the substance brought up a new hurdle. For example, one of the greatest setbacks for Fischer's team was to succeed in intensifying the effect on spider mites, only to see the compound damage the plants. But the researcher did not let that discourage him: "We had a new active substance class in our hands, something that happens only every

ten to 15 years at most. We couldn't just give up!"

"And you can't achieve anything without teamwork either," Fischer emphasizes. "Particularly when things go wrong, it is important to support one another, brainstorm and join forces to find a solution." That is precisely what Reiner Fischer and his team did. When they came to a dead end in the early 1990s, they refused to give up and in 1992 finally found a substance that was lethal for spider mites, but safe for their natural enemies, the crop plants and users. However, another ten years went by before the substance could be transformed into the product Envidor® with the active ingredient spirodiclofen.

In the meantime, Fischer and his co-workers continued to study the cyclic ketoenols, because even during optimization of the spirodiclofen, it became increasingly clear that this substance class offered more than just an active substance against spider mites. At Bayer's own testing station in Spain, agricultural engineers had made an interesting discovery: one of the trial substances unexpectedly proved to be effective against the whitefly, an insect pest. And there was yet another indication: a further tetramic acid derivative apparently was effective against aphids and other sucking insects. Just two years after the market introduction of Envidor®, Oberon® was launched to combat whiteflies and spider mites.



Award and honor: in 2004, Dr. Reiner Fischer (center) was presented with the Otto Bayer Medal by Bayer Management Board Chairman Werner Wenning (left) and Dr. Udo Oels, then Bayer Management Board member responsible for Innovation, Technology and the Environment, in recognition of his scientific achievements.

The third major project – the development of Movento® – required more effort. "Once again we had to wrestle with the problem of the substance harming not only the aphids, but also the crops," Fischer reports. It was a major advantage that, by this time, he was thoroughly familiar with the substance class. Fischer remembered a derivative from the early days of Envi-dor® research which was compatible with the plants, so he combined it with a compound effective against aphids. The result was a success in more ways than one: "Movento is a real innovation," Fischer says. The active substance

spirotetramat, unlike the other two ketoenols, is absorbed and then transported through the plant right into newly growing shoots, which are a real delicacy for aphids. Movento® has been available on the market in the United States since early summer 2008, and is scheduled to be launched in other countries in 2009.

Chemist, marathon runner and soccer fan

Reiner Fischer's entire research career is a perfect example of how endurance and perseverance can help you achieve

your goals. He even applies this principle in his free time, for example when he goes running. After starting out ten years ago, he now participates in marathons and has covered the distance 20 times. "Running and active substance research have several things in common," he notes. "In both, you have to keep going even if you hit the wall, even if the going gets tough." The sport not only gives him strength, it also helps him clear his mind after a long day at work. However, Reiner Fischer knows other ways to forget about chemistry, for example by playing cards with his partner and friends at home, going to home games of his favorite soccer team (Borussia Mönchengladbach), spending time with his 15-year-old daughter – or by getting outdoors, although it can happen that nature inspires the researcher with a good idea for carrying on with his ketoenols the next day at work!



www.pflanzenschutz-nachrichten.com/fischer
This website contains more information on this topic.

Success takes endurance: Fischer puts his daily work behind him and frees his mind by running marathons and enjoying nature. He also finds inspiration for new ideas and new applications for his active ingredients here.

