



Project to fight resistant weeds in South Africa

# New hope in the Cape

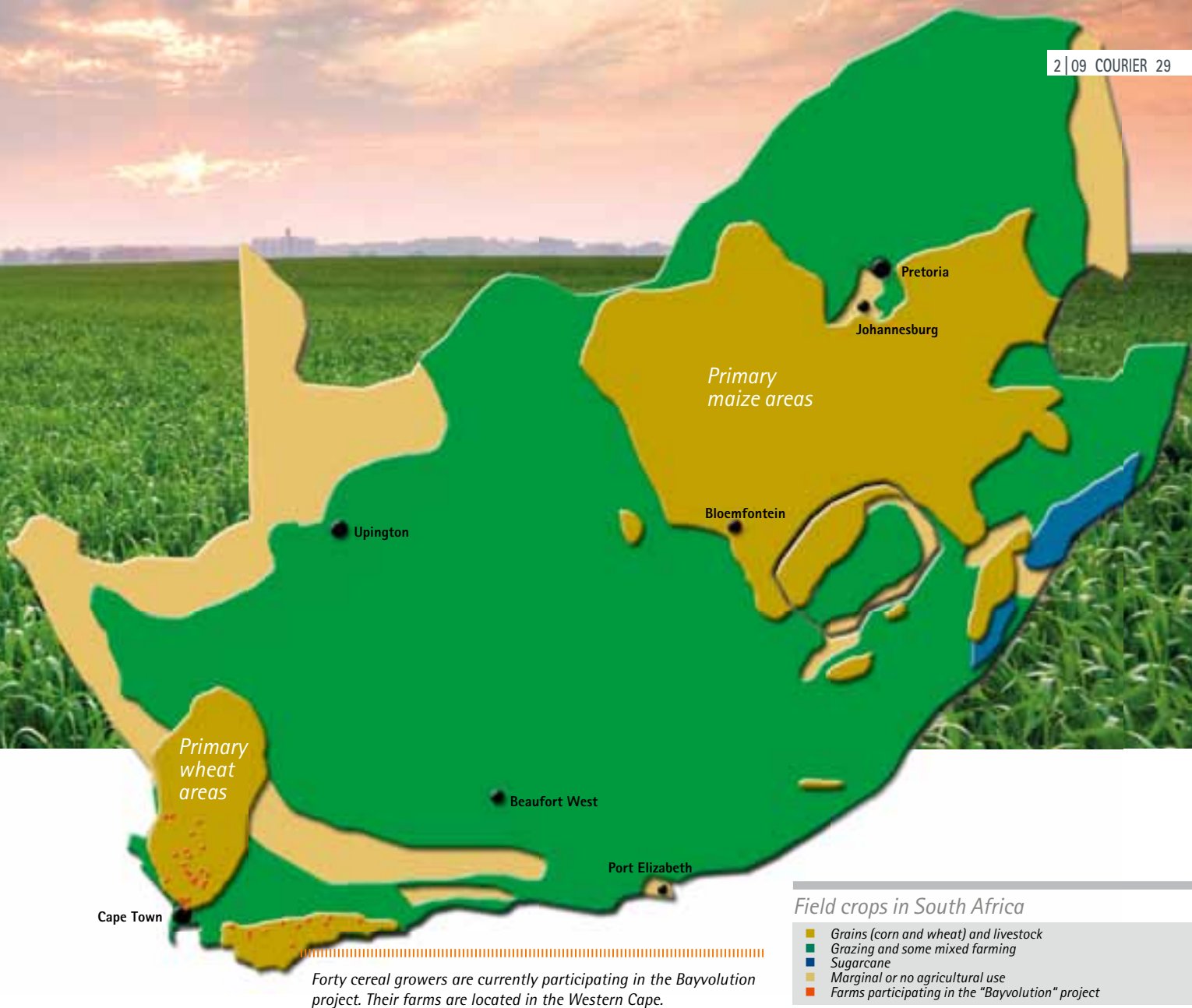
Many wheat growers in South Africa have a hard time dealing with resistant weeds. Bayer CropScience's high-investment "Bayvolution" project is designed to take a systematic approach to solving the problem. The first results – and the first successes – are already showing.

**M**oorreesburg – The Breadbasket of the Swartland. This is how the small town of Moorreesburg presents itself to visitors on its website. Why the breadbasket? Well, there are an awful lot of wheat fields in this vicinity, which lies a good hour's drive north of Cape Town. The almost 400 farmers who grow wheat here, harvest around 150,000 tonnes a year – which is seven percent of South Africa's total wheat production.

But in recent years, the mood among these farmers had been deteriorating, because many of them were finding that the herbicides that they were using to treat their fields were no longer effective in some situations – an experience

shared by many of their colleagues throughout the entire Western Cape Province. Rye grass and Wild oats in particular were proving to be less and less susceptible to a number of different herbicidal products. Surveys conducted in 2007 revealed that as many as 40 percent of the wheat farmers in Western Cape Province were experiencing herbicide resistance problems.

"There are areas, mainly in the south of the Swartland, in which wheat farming has practically ground to a halt – that's how serious the problem is", explains Andries Theron, whose family has been farming on the farm "Soutkloof" near Moorreesburg for five generations. He plants about half of his roughly thousand hectares to wheat each year. Theron says that he has had a success rate as low as 60 percent in terms of rye grass control on some of his fields. The yield losses are correspondingly serious:



"If 50 percent of the area is infested with uncontrollable rye grass, then the yield drops from four tonnes to only two tonnes a hectare", is Theron's rule-of-thumb.

However, there has been new hope since 2008. That's the year his farm first became involved in "Bayvolution", a project organized by Bayer CropScience that aims systematically to investigate the herbicide resistance problem in South African wheat crops - and to make recommendations for dealing with it. "We started the project in 2006 as an initial investigation aimed at confirming the prevalence of herbicide resistance in the Western Cape's wheat growing areas. Since 2008, we have been conducting on farm trials, assessing the results and capturing data in a systematic way", explains Hylton Oliver, Bayer CropScience's Portfolio Manager for cereal crops and herbicides in Southern Africa.

Forty cereal growers in the Western Cape are now participating in the project. Besides the area around Moorreesburg, wheat farmers from nine other bioclimatic regions are also involved. All of them have expressed their willingness to make ten fields on their farms available for research purposes. "We're applying four different weed-control treatment options, at single and triple rates, on each of these ten plots, according to a standard plan", says Oliver. The treatments differ from each other in terms of the class of active substance applied as well as the mode of action - a trial strip will typically include sulfonylureas (SUs), [ALS inhibitors] aryloxyphenoxypropionates (FOPs) and cyclohexanedione oximes (DIMs) [ACCase inhibitors] as well as an untreated control.

At the end of May 2008, Bayer initiated "Bayvolution" field trials with its own spray application equipment. Andries

Theron was among those receiving a visit from the all-terrain vehicle painted in Bayer's characteristic green, white and blue colours. The four-wheel drive vehicle is equipped with a rear mounted integrated spray rig that can be extended outwards for use; it also carries a GPS unit that allows it to match the trial site to a precisely-defined geographical position. Theron is pleased that Bayer is trying to solve the weed problem through its Bayvolution approach. "There is hardly any Government-sponsored research into agriculture in our country", says the Moorreesburg Farmer. "Nearly all investigations of this type are undertaken by the farmers themselves, or they're done by companies such as Bayer CropScience." The company's staff have meticulously evaluated the effects of the various treatments on a total of 400 trials plots, and have collected the results in a database. Each of the farmers was provided

with the results from their own plots – along with concrete recommendations as to how they can best deal with their particular resistance situation. “As soon as we had obtained an overview of the current resistance status of a particular location, we were able to advise which products belong to the most promising treatment strategy”, explains Hylton Oliver.

The “Bayvolution” approach doesn’t just involve Bayer staff visiting the project participants to present them with the research results and advice. In March 2009 – before the start of the new winter wheat season – the company also organized a resistance management seminar, which was attended by many farmers. Independent expert scientists were also invited: they presented information on the influence of factors such as crop density, tillage and crop rotations on weed prevalence.

### Create partnerships in order to create solutions

“Bayvolution also aims to create partnerships between farmers and other stakeholders in the business”, says Hylton Oliver. “This provides the basis for each of the participants to become more knowledgeable about herbicide resistance, and thus to be in a good position to work together to create solutions.” At the event held in Stellenbosch, Oliver gave a presentation on the different modes of action of the various herbicides available and provided tips as to

their proper use. “For example, applying reduced rates is just as risky as applying herbicides under unsuitable conditions,” says Oliver. It’s important to be informed about the characteristics of the individual herbicides and to select and apply them carefully, according to the registered recommendations.

Andries Theron from Moorreesburg admits that in the past, farmers have been a bit lax when using crop protection products. “Sometimes, we would apply the same herbicide year in year out. The knowledge was simply missing – and this alone has probably led to fifty percent of our resistance problems.” Indeed, surveys in 2008 revealed that as little as 18 percent of farmers took resistance seriously enough to alternate the herbicides they applied. “Whoever applies the same active substances in successive crops over a period of several years shouldn’t be surprised if resistance develops later on”, says Hylton Oliver. “By doing this, you run the risk that the herbicide you’ve been using becoming useless – along with the whole class of active substances that share the same mode of action.” This is why Oliver recommends carefully alternating the mode of action of active substance between alternating crops in a rotation. Even the notion of using crop rotations wasn’t obvious to all of his colleagues, as Andries Theron knows. He himself has long been alternating between winter wheat, pulses such as lupins, and clover. But there are still farmers who haven’t taken the principle of rotating crops to heart. “So along with mistakes made in the application of herbicides, poor agronomic practice is surely behind the other fifty percent of the resistance

problem”, believes Theron. But he also believes that farmers will start being able to deal with their problem as soon as they pick up the knowledge needed to change their habits. For this reason, Theron also hopes that “Bayvolution” will continue for a few years to come.

Working groups have now been created in all ten of the cereal cultivation areas in the Western Cape investigated in order to develop concrete strategies for each of the individual regions. “Farmers, dealers, scientists and the Bayer team work closely together,” according to Oliver.

The knowledge gained will be made available to other farmers elsewhere in the country too. Future events are being planned to allow the practical knowledge gained to be shared. In this way, many will be able to profit.

Andries Theron has already benefited. After having been presented with the results of the 2008 trials series by Hylton Oliver’s colleagues Chris Cumming and Org Lötter, he has re-organized his treatment programme for 2009. “Last year I used products that gave me only 60 percent weed control in some fields”, says Theron. “This year I’ve switched, based on the results gained from the test plots.” This has allowed him to achieve an excellent 90 to 95 percent control. A first success story.

“It’s good to see a company being interested in us not only as customers, but also as farmers”, says Theron. “This shows that Bayer CropScience doesn’t simply want to sell us products – they’re also prepared to invest in services like Bayvolution that help us to advance too.” ◀

*Karl Hübner*

Andries Theron took part in Bayer CropScience’s Bayvolution project.



The four-wheel drive vehicle, which is equipped with spraying equipment and GPS, is made ready for starting.

