

USA: GREEN INVADERS OVERRUNNING NATURAL LANDSCAPES

# Protecting grasses against introduced weeds

*Invasive plants like cheatgrass, which originated in Europe and Asia, are spreading in the United States. As they grow faster than native species, they are displacing them and suppressing the endemic flora. A Bayer herbicide could help to improve the control of those invasive species while leaving native plants unscathed.*



Steven Sauer has a weed problem. It is only fifty centimeters tall but extremely harmful, and is causing him plenty of headaches. The vegetation manager of Boulder County in the state of Colorado in the Western United States is responsible for landscaping the municipality's green areas. "Our parks and natural areas are increasingly being overrun by invasive species. In our case, these are grasses that are displacing our indigenous species – I can barely keep them under control," says Sauer. The invasive vegetation that is spreading in many regions of the West are winter annual grasses that have been introduced over the past centuries from Europe and Asia.

These invaders include the particularly aggressive cheatgrass, the rapidly spreading medusahead and wild winter rye. They germinate in fall and winter and grow quickly when the temperatures start to rise in spring, at a time when indigenous perennial species are in a kind of dormant phase. "The invaders take full advantage of their competitiveness. They take moisture and nutrients from the soil before the native plants can take their turn," explains Dr. Harry Quicke from the Bayer Stewardship Team for vegetation management in Windsor, Colorado.

Very often the invasive weeds are highly competitive. Some are able to use resources in the ecosystem that are unavailable to native species, e.g. by developing shallower roots or being able to survive on particular soil types. Another factor that promotes the spread of invading species is their inherent characteristics: rapid reproduction and growth rates and tolerance of a wide range of environmental conditions are common invasive traits that allow invading species to crowd out native organisms. Early-germinating winter grasses do not belong to the original flora of the regions in question. After a while, the alien plants dominate entire strips of land. Indigenous grasses, flowering plants and bushes are displaced, and with them the habitats for insects, small mammals and countless other wildlife species.

Another problem is grass fires. Invasive annual grasses die off in the summer and dry out. The dead vegetation forms layers of easily inflammable biomass, which acts as tinder for grass fires. Studies indicate that areas where cheatgrass grows are affected by grass fires every five years, while regions with intact native flora only burn every 60 to 110 years. After a fire, cheatgrass very quickly proliferates in the burnt areas but native species are unable to gain a foothold. A vicious circle begins.

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Dr. Harry Quicke

Vegetation managers like Sauer employ a combination of all possible vegetation control methods: mechanical methods such as cutting and mowing as well as biological and cultural methods that take advantage of plant competition, natural herbicides and animal predation. "Man-made herbicides like Bayer's help this process along by controlling undesirable weed species," explains Dr. David Spak, head of the Vegetation Management Stewardship Team at Bayer. "The idea is to use the right tool at the right time to keep inputs to a minimum and make management sustainable." This approach not only benefits the environment, but also reduces overall costs.

The herbicides that Sauer used in the past were only effective for a short time. But now he can be optimistic that a newly developed product from Bayer could become his new preferred solution against invasive weeds and grasses. ▶

Taking a closer look: Dr. David Spak investigates various products for their ability to control invasive weeds. Here he is testing the native annual ryegrass, a member of the Gramineae family. As head of the Vegetation Management Stewardship Team at Bayer, Spak monitors all the environmental factors.



The product inhibits the biosynthesis of cellulose, the most important component of plant cell walls. Derek Sebastian, currently a member of the Vegetation Management Stewardship Team at Bayer in Greeley, Colorado, tested the herbicide in greenhouse and field trials for his doctoral thesis at Colorado State University. The researcher was able to confirm the benefits of the

then die off at an early stage. One particular advantage of the product is its selectivity. Because of its chemical properties, the herbicide tends to stay in the surface layers of the soil – the zone in which the seeds and seedlings of the invasive species lie. Native perennial plants have deeper roots, which the herbicide cannot reach.

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Dr. David Spak

Sebastian demonstrated the long-term efficacy of the agent in multi-year studies. One single treatment controls weeds for three to four years. During this time, the reservoir of seeds in the soil becomes depleted. Thanks to the removal of competition from the invaders, the indigenous flora is quickly able to restate itself. "Even I was surprised by how quickly the remaining native plants recover," says Sebastian. The biologist loves the landscapes of the Western United States. "I'm happy about every new tool that we get to protect these lands."

product in 35 trials conducted in collaboration with Bayer and vegetation managers like Sauer. Sebastian's main focus was on investigating its efficacy on the particularly destructive cheatgrass. The agronomist is proud of his findings. "The fields which were overrun by cheatgrass recovered remarkably quickly after treatment with this agent."

The success of the herbicide has generated great interest. Quicke and his colleagues are now working together with vegetation experts from all states in Western USA who are testing or using the product. More than 80 successful trials back him up. "Parks and grounds below high voltage utility lines, nature reserves, roadways – this agent meets our customers' expectations in all situations!" says Quicke. And the government is also interested. In March, Sebastian gave a presentation about his experiences with the product to government officials from the Federal Interagency Committee for the Management of Noxious and Exotic Weeds, whose agencies manage the 260 million hectares of land in the United States that belong to the federal government.

The product is applied to weed-infested areas before the winter grasses germinate. The seedlings of the harmful plants



Dr. Harry Quicke (photo left, left) liaises with vegetation experts who test or use the new herbicide. Derek Sebastian has demonstrated the advantages of the product in 35 studies, among them laboratory trials with grass samples (photo right).

Use of the product is currently being reviewed not only in the West but also in other areas of the United States. Spak is testing the product as a weapon to be used against the invasive weeds that are spreading in the country's eastern states as well. Japanese stiltgrass, for example, which Spak calls "the cheatgrass of the East", was introduced in the southern state of Tennessee at the beginning of last century. Shipping agents formerly used the plants as a packaging material for porcelain. The weed can now be found in 16 states from New York to

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Derek Sebastian

Florida. In early spring, the adaptable migrant which flourishes in both full sunlight and heavy shade forms a sea of grass in forests, along rivers and in parklands, displacing the native vegetation.

## Interview

# "Native species are reclaiming their territory"

Steven Sauer is the vegetation manager for Boulder County Parks and Open Space in the state of Colorado in the Western United States. The areas that he looks after are dedicated to the recovery and preservation of natural landscapes. For the past two years, he has been using the new herbicide in the context of a study by Colorado State University. research talked to him about the advantages of various herbicides.



**Steven Sauer**

### What kinds of problems are you having with invasive species?

Various species of grass including cheatgrass, Japanese brome and wild rye are spreading faster all the time and destroying the original ecosystems. In dry years in particular, the native plants have no chance against these invaders.

### How have the results been?

Outstanding. Within just a short time, native species which were displaced have reclaimed the areas that we treated. The difference to before is incredible.

### What advantages do you see in comparison with other products?

One particularly important factor is the long-term action. We used to use other products that were only effective for one or at most two years. Trials with the product show that one single treatment is sufficient for at least three years. That means that we have to spray less often, which is good for my budget. And what's more important, the native vegetation can reestablish itself in the treated areas and withstand future invaders.

The hot and humid south-eastern United States is being increasingly overrun by invasive annual ryegrass, which complicates the management of roadsides. The weed grows rapidly so early in the year that roadside managers now have to mow these roadsides much earlier than before. "Mowing can kill nesting birds, reptiles and mammals which inhabit these areas. It also generates greenhouse gases, is a potential hazard to workers and passing motorists, and is a very expensive operation," says Spak. According to his investigations, using Bayer's new herbicide can reduce the need for mowing from three times a year to twice or even just once.