



Success in the search for substances to control ragweed

Unwanted invaders

Climate change is not only altering growing conditions for agriculture: farmers are also having to cope with unknown enemies. Weeds and pests from other climate zones are increasingly appearing in their fields. Researchers working for Bayer CropScience are looking for substances to control these new plagues.

This tiny plant with delicate, feathered leaves looks perfectly harmless. "Be careful, don't touch it," warns Dr. Hansjörg Krähmer, who works for Bayer CropScience at its Frankfurt site. This is because the unassuming plant, grown for test purposes in one of Bayer's glasshouses, is one of the most pernicious weeds in Europe. One of the problems is that *Ambrosia artemisiifolia*, or common ragweed, can cause red, itching weals on the skin of anyone who touches it. However, a greater cause for concern is its highly allergenic pollen. Just a dozen

grains in a cubic meter of air is enough to trigger a severe attack of sneezing or asthma in someone who is allergic to it. The peak season for pollen release is July to October.

Ragweed is a newcomer not only to Bayer CropScience's glasshouses. It is also becoming more widespread on the fields of many farmers in central Europe. This weed, which arrived in Europe from North America 140 years ago, is now common in Hungary and the Balkans but also in some parts of France and Italy. About twelve percent of the popula-

tion is already allergic to ragweed in the areas affected. A single plant can produce 4,000 seeds, which remain viable for decades. "We have to assume that ragweed will advance northwards if temperatures continue to rise," comments Krähmer. This is because heat helps the plant to grow. It germinates in mid-April, when spring begins in central Europe. It is not affected by high temperatures and drought during the summer. Ragweed also competes successfully with native flora, reducing biodiversity if it is able to spread unchecked.

Interview

“Interrupting the life cycle”

Christian Bohren conducts research into weeds at the agricultural research institute Agroscope Changins–Wädenswil ACW in Nyon, Switzerland. *research spoke* to him about ragweed control.



Where is ragweed found?

The seeds are transported mainly by bird feed or by harvesting machinery that has not been cleaned. This is why the plants often grow in gardens and fields. But they are also found in other locations where bare soil is visible, such as on the roadside, railway embankments, building sites and gravel pits.

What does it look like?

The seeds germinate in April or May and the plants remain quite small until June. They have feathered leaves. Both the upper and lower surfaces are green, and the leaf veins are white. Other features include hairy stems and upright inflorescences that resemble bunches of grapes.

What is the best way of controlling ragweed?

It is vital to interrupt the life cycle. This means preventing seed formation. This stops the plant reproducing. Individual plants should be uprooted before they release pollen (in July). Simply pulling out the plant without its root does not help at all, as ragweed will quickly regrow from the root. Herbicides can effectively control ragweed in many crops provided that the products are applied while the plants are still small. Where herbicides cannot be used (for instance, at the roadside, in nature conservation areas, alongside rivers and lakes), cutting the plants back before pollen has formed and again in early September is the best way of preventing seed formation. A two-pronged approach (cutting back and then applying herbicides) is the most successful method.



Benefiting from climate change: the Ambrosia plant is spreading northwards as a result of changing climatic conditions. Bayer scientist Dr. Hansjörg Krähmer (large photo left) has found an active ingredient that successfully controls the weed.

Bayer CropScience's crop protection experts are constantly searching for new herbicides to gain control of the invader, however. Krähmer and his colleagues are using a half-hectare glasshouse plot to test the use of potential new herbicides on crop plants such as wheat, barley, rice, cotton, soybeans, corn, rapeseed and sugar beet, and their effects on the principal weeds that thrive in these crops. They have already discovered a substance that is effective on ragweed: Bayer's herbicide Laudis®, which is particularly useful in corn. Its active ingredient, tembotrione, prevents the formation in weeds of the pigment carotene which protects plant chlorophyll from ultraviolet radiation. This causes the leaves to lose color and wilt, and the weeds die.

Corn plants are protected by the additive isoxadifen, a safener which allows maize to break down tembotrione rapidly. "The advantage of the new substance is that it is very well tolerated by all corn varieties. And it has a new mechanism of action against which weeds do not yet have any resistance," says Krähmer. Laudis® has already proven to be effective not only in glasshouses in Frankfurt but also in field trials. A study conducted in Saxony confirmed that Bayer's innovative herbicide is 99 percent effective in controlling aggressive ragweed.

Krähmer likes to keep a close eye on unwanted invaders himself, both in the glasshouse and in the wild. A walk through the Industriepark Frankfurt-Höchst gives him an insight into invasive

flora every day. Narrow-leaved ragwort and Canadian horseweed with its pale yellow flowers are two typical invaders which flourish on the edges of paths and wasteland here. He also notices changes to the spectrum of native species, such as a marked rise in the prevalence of hoary cress. But he says that "fortunately" he has never seen ragweed in Frankfurt.



www.omafra.gov.on.ca/english/crops/facts/ontweeds/common_ragweed.htm

This website provides more information about common ragweed.