ON THE
SCENT TRAIL

PHOTO: ANNA SCHROLL FOR MPG

ON LOCATION

Banning perfume in the workplace – isn't this going a bit too far? Well, in order to study insects' sense of smell, even more precautions are also necessary. This is because some insects have such an extremely delicate 'nose' that they can even detect individual molecules of an odorant in the air. Bill Hansson and his team at the Max Planck Institute for Chemical Ecology want to understand how the sense of smell has evolved. One of their favorite subjects is the tobacco hawkmoth *Manduca sexta*. Its 'nose' is its large and very mobile feelers or antennae. The moths use these to find their mates, sources of nectar, and the plants on which the females lay their eggs with absolute precision.

How do they do it? Do animals have to learn this behavior? And which structures in the brain are involved and how? To find out, researchers have a state-of-the-art wind tunnel at their disposal. The system produces up to 800 liters of fully-conditioned air per second, the temperature can be regulated in the range of 15 to 30 degrees Celsius, and the humidity from 20 to 90 percent. The air used for this is always freshly drawn in and processed. Lighting is provided by a luminous ceiling of LEDs that can simulate day and night light.

Tobacco hawkmoths are predominantly nocturnal so the experiment shown here takes place under red light, which the animals cannot see. The moth starts from a transport tray and at the other end of the tunnel is a tobacco plant. Wind enters behind the plant in the direction of the moth. It carries the plant's natural scents or other scents placed there and allows the moth's behavior to be closely observed and recorded.