

Ecological infrastructure Case study 10

Control important agricultural pests
by combining wetland restoration and
conservation with good farming practices.

Push-pull pest control for sugar farmers

KWAZULU-NATAL MIDLANDS

South African sugarcane farmers' most serious pest is a small grey moth that lives naturally in wetlands on the East Coast. They've recently found that if they keep wetlands intact, the natural vegetation draws the pest out of the crop.





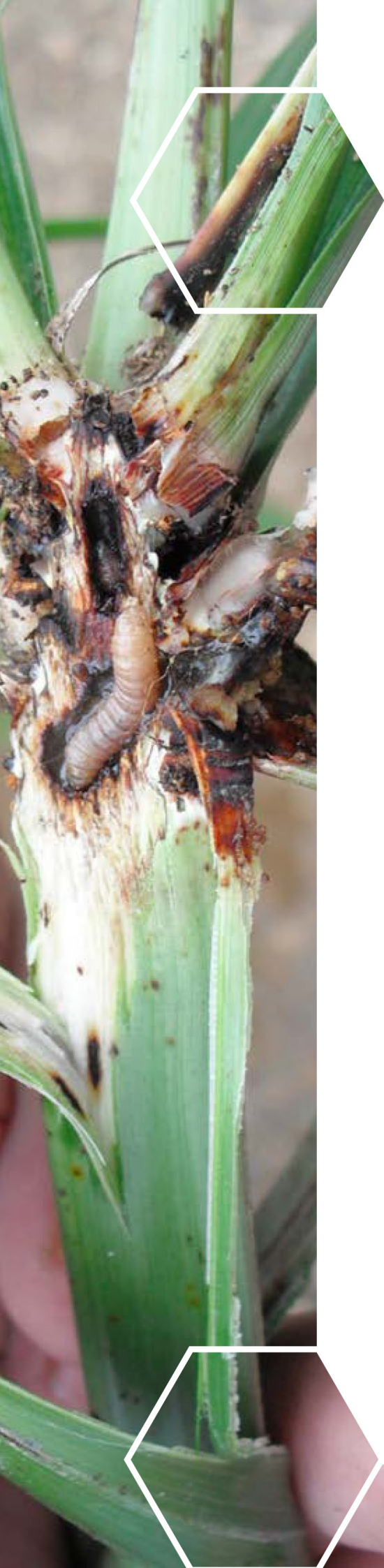
When farmers first started planting sugarcane along the East Coast's rolling hills, they had no idea that by pushing their ploughs up to the edge of wetlands, or often even into them, they were opening a Pandora's box. By disrupting the precious natural balance here, they inadvertently created the industry's biggest pest.

Living naturally in those wetlands is a nondescript grey moth called *Eldana* which, when it breeds, lays its eggs on sedges in the wetlands. When these hatch, the little caterpillars bore into the sedge's stem in search of food. The plant panics in the face of the attack, flooding the air with a burst of stress pheromones.

This signal catches the attention of wasps (and other natural enemies), which start patrolling through the sedges, looking for the source of the attack. These predators are looking for their own food – they rely on the moth's caterpillars as an important protein source, and in doing so, are part of a delicate natural system that keeps itself in balance.

What the farmers didn't know is that this moth would fall head-over-heels for sugarcane, a sweet grass species from South Asia, which doesn't have the same kind of defences in place to deal with an attack from hungry caterpillars.





Farmers began planting their cane fields right up against the edges of the wetlands. Sometimes they'd even dig drainage channels in the wetlands to dry them out in order to cultivate them. The moth, losing its natural sedges, adopted a home that was just as good: the sugarcane plants.

'The moths fly into the cane, lay their eggs as normal, the caterpillars hatch and begin boring into the stem of the cane to feed,' explains Vaughan Koopman, programme officer with the Mondi Wetlands Programme, WWF-SA (the South African chapter of the Worldwide Fund for Nature) in KwaZulu-Natal. This causes the cane to become diseased and rot.

'But the cane doesn't release the same stress hormones as the indigenous sedges when it's under attack like this, so there's no signal to the predators to come hunting for the caterpillar.' This small, night-manoeuvering moth isn't a strong flier and can't move great distances. But without any patrolling wasps and other predators to keep its population numbers in check, it has become the South African cane growers' most serious pest.

'The moths fly into the cane, lay their eggs as normal, the caterpillars hatch and begin boring into the stem of the cane to feed, but the cane doesn't release the same stress hormones as the indigenous sedges when it's under attack like this, so there's no signal to the predators to come hunting for the caterpillar,' explains Vaughan Koopman.



In terms of the cost of crop losses, there are various estimates ranging from between R60 million and R150 million in direct crop losses per year,' explains WWF-SA's Eldana expert, Jessica Cockburn.

'And now,' says Koopman, 'it seems to be moving inland. No one is absolutely sure why. It could be that the moth is being shipped around on cane trucks, for instance; or maybe rising temperatures are making conditions more favourable for the moth to thrive at a higher altitude than before.'

Either way, the cane growers of the KwaZulu-Natal Midlands are taking measures now to make sure that it doesn't become as big a pest for them, as it has for farmers closer to the coast.

Pushing from the cane, pulling from the wetland

The good news, these farmers have found, is that it's possible to get the moth out of the cane and back into the wetlands. But it needs a two-fold strategy. Firstly, restoring the wetlands not only gives them the sedges they prefer to live on, but it also revives the habitat for the predators that control their numbers. This 'pulls' the moth out of the cane and back into the indigenous vegetation.



Secondly, farmers can ‘push’ it from the cane field side: by planting indigenous molasses grass and by following good farming practices, they can drive the moth out of the sugary grass.

Cockburn explains that molasses grass is a local species that repels the egg-laying Eldana moths, while at the same time attracting natural enemies into the crop fields.

‘This is the “push” component of the push-pull strategy and it’s crucial for farmers. Molasses grass is usually planted on roads and contour banks between cane fields, so farmers don’t have to sacrifice any land they’d rather plant under cane,’ she says.

On its own, even without a healthy wetland nearby, molasses grass can reduce the damage to cane by up to 50% and is thus a potent tool in managing the pest. In addition to that, healthy cane fields are also more resilient against the onslaught of this moth.

‘This is the “push” component of the push-pull strategy and it’s crucial for farmers. Molasses grass is usually planted on roads and contour banks between cane fields, so farmers don’t have to sacrifice any land they’d rather plant under cane.’



Working together to rehabilitate the land

‘Eldana particularly likes sugarcane that’s either over-fertilised, or that is very stressed,’ explains Koopman. ‘Well-farmed cane isn’t as attractive to the moth. That’s why this is an integrated approach to pest management.’

This could mean mapping the soils on a farm and matching the most appropriate sugarcane variety to that soil. It means keeping the soils healthy, too: ploughing, contouring and road management that prevent erosion from stripping away topsoil; keeping organic matter in the soil; not over-fertilising; where possible, giving accurately applied supplementary irrigation in times of drought. It also means controlling weeds.

‘We’ve seen it clearly in areas where there are healthy wetlands, and well-managed cane fields. When moth numbers are counted, they’re significantly higher in the wetlands than in the cane fields,’ says Koopman.

‘Eldana particularly likes sugarcane that’s either over-fertilised, or that is very stressed,’ explains Koopman.



Many cane growers in the KwaZulu-Natal Midlands are now working with WWF's

Mondi Wetlands Programme, to restore their wetlands to health. They're filling in drainage canals. They're cultivating indigenous sedge host plants and reintroducing them to the wetlands. They're pulling their cane fields back from the edges of these wetlands and removing invasive alien species such as wattles and eucalypts.

'We've seen it clearly in areas where there are healthy wetlands, and well-managed cane fields. When moth numbers are counted, they're significantly higher in the wetlands than in the cane fields,' says Koopman.

Even though wetland rehabilitation can be costly, farmers are able to see the greater returns on this investment, particularly as healthy wetlands are a bridgehead against the advancing front of such a serious sugarcane pest.

CONTACT PEOPLE:

Ms Jessica Cockburn
Mondi Wetlands
Programme,
WWF-SA

E-mail: jessicacockburn@gmail.com

Mr Vaughan Koopman
Programme Officer,
Mondi Wetlands Programme,
WWF-SA
E-mail: vkoopman@wetland.org.za

