Lessons from the Italian ban on pesticides

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Exposure to sub-lethal doses of neonicotinoids may have a long-term effect on bees. One of Italy's top bee researchers recommends a ban on insecticide-coated seeds and in reintroducing rotating cultures against pests invasion.

Marco Lodesani is the director of the honey bee and silkworm unit at the Agricultural Research Council (CRA-API) in Bologna, Italy. He coordinated Apenet, one of the first study highlighting the role of neonicotinoids in Colony Collapse Disorder (CCD). This pesticide is thought to be the culprit behind this sudden and mysterious decline in the number of bees observed during the last decade across the globe. The evidence linking these neonicotinoids to CCD is significant but not yet conclusive.

Lodesani tells youris.com about the consequences of the Italian precautionary ban on the use of neonicotinoids in agriculture imposed in 2008, now, the European Union opted for a similar ban in the EU, limited to two-years, and the latest research on bee decline.

Five years after the ban of neonicotinoids in Italy, did you observe a recovery of the bee populations?

Following the moratorium, there was a clear and dramatic improvement in the number of bees and colonies. Italy has only banned neonicotinoids when they are used for coating maize seeds. It is still permitted to spray the same compounds on leaves. This comes in part from our work.

We showed that a major source of contamination comes during sowing. Particularly, when bees are exposed to dust from neonicotinoid-coated maize dispersed in the air. As a result of the ban, we have observed a sharp drop in mortality around the maize fields, and in spring, when sowing takes place. This is consistent with our previous findings.

By contrast, the mortality of bees is still high in the areas where neonicotinoids are allowed to be sprayed on leaves. We have now set up a wider monitoring network called Beenet that includes 3,000 stations all over Italy. And, at least in the maize-cultivated areas, CCD is virtually over following the ban.

What did we learn in the past few years about the causes of CCD and the link with neonicotinoids?

Until recently, studies focused on the immediate, lethal effects of pesticides on bees. In other words, they looked at the dose that is needed to kill bees if they are exposed to a certain insecticide.

However, it is now clear that sub-lethal doses have a chronic effect that may be even more critical. When bees fly over the dust from coated seeds, they accumulate small doses of neonicotinoids that do not kill them. But it affects both each individual and the colonies in more subtle, long-term ways. For example, contaminated bees have a weaker immune response. This makes them more susceptible to viruses, which are a major cause of death.

Other effects are neurological and include learning problems, impaired orientation, or the inability to remember colours and odours. All of these aspects are crucial for the social organisation of colonies.

Are these chronic effect taken into account by the

industry when testing for the safety of new compounds?

Not really. Testing is largely based on assays that look at the acute toxicity of compounds. But with CCD you do not necessarily expect to see bees decimated right in places where they use pesticides. You need to look at sub-lethal effects that are more insidious and difficult to study, but still involve entire colonies.

Based on your experience, do you think that the EU moratorium could be effective against CCD?

I totally support the EU decision, which stems from our studies, and many others. I would even like to see a total ban on seed coating with pesticides. There is an increasing trend in using coated seeds as a pre-emptive measure against parasites. Let me put it straight: coating seeds with insecticides has many drawbacks and brings no real advantage to farmers. It is like taking a pain-killer in the morning, just in case we are likely to have a headache in the evening. Today, there are many pest indicators available to farmers. They could only use insecticides when there is an impeding danger for crops.

Critics argue that a ban on neonicotinoids may result in lower yields for farmers, who may even recur to older, more dangerous pesticides. What is your view on this issue?

Our findings suggest the opposite. In Italy, for example, we found out that the yield of maize was not affected by the ban on neonicotinoids. We have to rethink the way we do farming today. Traditional methods, such as rotating cultures, are effective in reducing the amount of

common parasites in plants. You see, we start from science, but we end up talking about the cultural, and environmental changes that we should undertake.

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