

And Now, Something Completely Different



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I took a trip to Colorado back in July and visited the Florissant fossil beds some 50 miles west of Colorado Springs. These fossil beds and other formations in the area are some 34 million years old. I dug for fossils at locations close to the National

Monument and was successful at finding numerous plant and insect fossils embedded in the rock that was formed by successive layers of muck deposited on the bottom of a prehistoric lake or sea.

Discovering these fossils got me thinking about the struggle between insects and plants. Plants and their insect pests are not new. In fact, they have been around since at least the Carboniferous period some 400 million years ago and probably for many years before that.

The story is a simple one. Plants take energy from the sun and convert it into chemical energy stores. Insects don't see any reason that they shouldn't exploit that resource. The plants suffer from this exploitation until the plant begins to "defend" itself by some novel method such as production of a poison, tougher leaves, bad taste or whatever. Now the insect suffers until it undergoes changes that allow it to re-exploit the plant resource. Then, the plant suffers again, until a new defense is developed ad infinitum.

Present day is here, and we have altered this intricate dance between the plant and its herbivorous insect pest through the use of pesticides, selective breeding and genetic manipulation. One might think that this altering only began when genetically modified organisms (GMOs) became common. Actually, it began with the advent of human cultivation. We routinely select for those attributes that suit us and have done so for thousands of years.

Pesticides altered the playing field again. When we began extensively using pesticides in the 20th century, it was thought that insects would never again be a problem for farmers.

Wrong! It didn't take long for those organisms that we were trying to eliminate to adapt and thrive again. Pesticide resistance is now commonplace. Crop rotation is not even exempt; a variant of the western corn rootworm began laying its eggs in soybeans rather than exclusively in corn. This enabled it to be present the following year in corn, thus rendering that type of crop rotation ineffective.

Pests should have no trouble overcoming genetically modified organisms as well.

So what should we do? Pesticides, GMOs, cultural practices, new plant breeds, etc. are all tools in the Integrated Pest Management tool box. All are useful and can remain efficacious if used responsibly. This requires that we use each one only when needed; we need to avoid overusing them to the point of selecting for pests that are not affected.

What I am referring to is something like this I frequently see farmers treating their fields for one type of pest, and in an effort to get ahead of any pest problem, tank mix another pesticide for application in a prophylactic manner, even though there are no pests present. Let's say a field needs a fungicide application. It seems to make sense to apply a pesticide such as chlorpyrifos to keep aphids under control at the same time. This saves time and money since you are already running your sprayer, right?

Simply put, this is a dangerous practice. Not only does it keep selective pressure on pest species (a long-term problem), but it could actually cause a worse problem in your field by releasing the pest species by killing its natural enemies (a short-term problem) and causing you to have to make further applications for control.

I could quote a lot of clichés such as "nature abhors a vacuum" or discuss "niche theory." But the bottom line is that we all need to use our IPM tools wisely. If we don't, life will find a way around them, and our IPM tool box will be empty. △

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