



The Atlanta Journal-Constitution

OPINION: Tuesday, January 24, 2012

Pesticides help modern farming

By David C. Bridges

Warning: Recent studies may challenge deeply held assumptions about pesticides and the environment.

Most agronomists understand farm pesticide use is perhaps the single greatest factor in protecting wildlife, saving habitat and keeping our waters clean. Recent scholarship should help the truth of that assertion reach the public.

Pesticides empower us to grow much more per acre than we did 40 years ago. Stanford University researchers found that, without modern farming, cultivated farmland would likely need to double to produce the same amount of food.

Modern farming, including pesticide use, has saved a land mass greater than Russia from falling under the plow. Mechanization, fertilizers, plant breeding and biotechnology also play key roles in modern farming. But studies show environmental gains directly attributable to pesticides.

In a new study, agronomist Mike Owen of Iowa State University says pesticides help U.S. farmers produce four times the corn and wheat of the early 1900s without clearing forest habitats or draining wetlands.

Because herbicides control weeds without plowing, the University of Wisconsin's Paul Mitchell reports in a companion paper that farmers save more than 550 million gallons of fuel per year, equaling more than 2 billion pounds of carbon-dioxide emissions. Greenhouse gasses are not released into the atmosphere.

The key is "no-till," or "conservation till," farming. Residue from prior crops is left on the field, acting as natural mulch, holding soil and moisture, and deterring weed growth. Farmers simply seed and spray.

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Organic practices a better option

By Jay Feldman

"First do no harm," a concept central to medical ethics, is important in an age when indicators of agricultural pesticide (including herbicide) pollution represent a serious threat to environmental sustainability.

It's an unnecessary threat given the productivity, profitability, and environmental and health benefits of organic agriculture.

The return on pesticide-intensive agricultural practices has proved unrealized, considering billions of dollars in secondary or externalized costs — from \$2.2 billion in annual pesticide poisonings, water treatment and pollination, according to two Iowa State University economists, to \$10 billion, according to the research of Cornell University professor David Pimentel.

A new study extols the benefits of conventional no-till farming and the herbicide atrazine, but ignores secondary pollution, health, and production costs.

Atrazine has been shown to affect reproduction of fish at concentrations below EPA water-quality guidelines, according to a U.S. Geological Survey study.

Used with genetically engineered crops bred to be tolerant of specific herbicides, another widely used no-till herbicide — glyphosate (Roundup) — is linked to acute human health effects and non-Hodgkin lymphoma. Atrazine and glyphosate-tolerant crops contribute to a cycle of increasing dependency on toxic chemicals in agriculture.

USDA's National Agricultural Statistics Service 2010 Agricultural Chemical Use Report finds 57 million pounds of glyphosate applied in 2009 on corn fields in surveyed states, an increase from 4.4 million pounds in 2000. Because of this, atrazine use declined.

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Plowing promotes decomposition of organic matter that is needed to hold water and critical nutrients, enhance soil productivity and support biodiversity. It leaves soil loosened, upturned and prone to erosion, ultimately polluting the air and water. With no-till, run-off drops, soil is saved. Surface water is cleaner. No-till depends on controlling weeds without the plow, once again demonstrating the importance of herbicides.

Mitchell says some 88 million acres, or almost 36 percent of U.S. cropland devoted to major crops, use one of numerous no-till systems. One family of herbicides, triazines, was instrumental in this revolution. One of those — atrazine — gave corn farmers the confidence to adopt no-till methods.

In 2010, I joined Owen and Mitchell, and Richard Fawcett, a retired Iowa State University professor, to quantify the benefits of triazine herbicides. No-till, made possible by atrazine and other triazines, reduced erosion by more than 40 percent in the last 30 years. That saves some 55 million to 85 million tons of soil a year.

The study's findings are applicable to Georgia farmers. Atrazine and other pesticides add more than \$2.4 billion of crop production in Georgia. They control weeds and help the environment. Atrazine is vitally important to our economic health.

Mitchell estimates the saved soil's value between \$210 million and \$350 million per year. The greenhouse gasses not emitted — because farmers are not plowing — tally as much as 280,000 metric tons per year.

One might think environmentalists would celebrate. No.

For instance, American Public Media's "Marketplace" program recently began a series of reports on agriculture. It interviewed a Mexican farmer who practices no-till, and noted it is widespread in the U.S. Not once did the word "pesticides" come up, let alone any pesticides that make no-till possible.

Perhaps "Marketplace" chose not to challenge its audience with all the facts. That's not surprising, since its audience — and all of us — are barraged by negative stories on pesticides usually by activists who oppose modern farming itself.

David C. Bridges is president of Abraham Baldwin Agricultural College in Tifton.

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What the chemical no-till study researchers should, but do not, ask is the question of pesticide essentiality. Organic agriculture is now a \$26.7 billion industry in the U.S. and \$54.9 billion worldwide. We do not need these toxic chemicals to meet our food productivity, profitability, environmental and public health goals.

A Rodale Institute study comparing organic and conventional cropping systems over a 22-year period shows equal yields for corn and soybeans, with the organic yields increasing after several years. Additionally, the study finds that 30 percent less energy is required.

Internationally, the United Nations Environment Program reports that 114 farming projects in 24 African countries using organic or near-organic practices increased yield by more than 100 percent.

Conventional no-till farming is advanced as part of a chemical approach that incorporates synthetic fertilizers and pesticides, creating a cycle of dependency as soil is depleted of its microbial life and natural mechanism for producing soil nutrients and building the soil food web, which contribute to plant health.

Organic no-till farming, though, has the benefits of conventional no-till farming and more. It minimally disturbs the soil and provides erosion control with the planting of live cover crops between rows. That eliminates toxic chemical inputs, reduces fossil fuels and synthetic petroleum-based fertilizers, builds the organic matter in the soil, increases water retention and eliminates contamination of waterways. It also protects human health and the environment, sequesters higher rates of atmospheric carbon and reduces the pressure on global climate change.

Beyond Pesticides' pesticide-induced diseases database links pesticide exposure to asthma, autism, learning disabilities, birth defects, reproductive dysfunction, diabetes, Parkinson's and Alzheimer's diseases, and other illnesses.

The studies signal an urgency to transition chemical-intensive agriculture to organic practices.

Jay Feldman, executive director of Beyond Pesticides, a Washington, D.C.,-based coalition, serves on the National Organics Standards Board.