Pesticides and You

News from Beyond Pesticides: Protecting Health and the Environment with Science, Policy & Action

Volume 33, Number 1
Spring 2013

BEE Protective

Beyond Pesticides Launches New Campaign

Special Issue!

16-page color brochure on creating pesticide-free, pollinator-friendly habitat

BEE Protective with Organic Systems

At Beyond Pesticides we are building our programs around clear, concise, verifiable organic standards that nurture biological systems and are focused the survival of the planet and all its inhabitants. That is why our successes at the Spring 2013 National Organic Standards Board meeting, with the help of tens of thousands of public comments, including those who support and work with Beyond Pesticides, is an important watershed moment that must be seen as elevating our campaign to grow organic with integrity. Thank you to all those who responded to our call for public involvement in the decisions that govern organic. To bring organic into the mainstream as a meaningful vehicle for nurturing and protecting life, we will have to multiply by many times the level of public involvement.

Growing Organic with Strong Standards

There are those who feel that the only way to grow organic is to allow chemical inputs that have questionable or adverse effects on biodiversity. It is our view that organic will not overtake conventional chemical-intensive practices if we weaken standards. So, when a medical doctor associated with the Infectious Diseases Society of America, a world renowned clinician and researcher, took the time to travel to the NOSB meeting and tell the Board that use of antibiotics, even small amounts, in agriculture, let alone organic agriculture is a serious public health threat, it was an important moment. He raised urgent public health issues that link bacterial resistance to antibiotic use in agriculture and brought the kind of information to the decision making process that will help to make organic the leader it must be in protecting life. The Board voted to stop the use of tetracycline in the only organic production allowed –apple and pears. It would not have happened without your involvement.

Accountability

I am often told by people that government has taken over organic or that we cannot trust the USDA organic label. We are at a critical juncture where this statement may become a self-fulfilling prophecy if we do not escalate what we did at the Spring 2013 NOSB meeting –where 15 people from the environmental, consumer, grower, retail, and organic certifier community sat around a table and listened to public comments from organic stakeholders. While certainly there are USDA organic decisions with which I disagree, the core value embedded in the statute and the underlying legal framework and decision making process is sound. If we choose to leave the process to those who believe that organic will grow with toxic chemicals that defy the soil building, preventive oriented, anti-GMO, anti-sewage sludge (bio-solids), anti-irradiation, anti-synthetic fertilizer approach of the *Organic Foods Production Act*, then we will see organic fade, and with it the opportunity to transform polluting land management practices.

We do need to be rigorous in our oversight of government and industry. So, when USDA ignores a decision by a 2012 NOSB decision to take carrageenan out of organic infant formula (we supported taking it out of all organic food) because of its link to cancer associated with a toxic component, we must stand up and remind the Department of the letter, core values, and principles of the law (as we are doing just as this issue of *Pesticides and You* goes to press) –and do it loudly. It is our law and our future.

BEE Protective

The fate of honey bees, other pollinators, and beneficial organisms generally is a case in point. We are dedicating this issue of *PAY* to our collective need to protect pollinators, with a focus on honey bees. The extraordinary decline in honey bee populations is a testament to the failure of the Environmental Protection Agency and other government agencies to curtail hazardous pesticides through risk mitigation measures. We do not begin to test for the effects of multiple mixtures of toxic pesticides, and their combination with other toxic chemicals, on the ability of life forms to exist. We allow widespread toxic chemical use that is not proven to be needed, given effective alternative organic practices. When the system is shown to fail through major environmental catastrophes or public disclosure of really clear adverse impacts like cancer, the regulatory system responds with restrictive action. And for those species we identify as threatened or on the brink of extinction, government intervenes. But for the slow decline, the subtle effects on learning, the impacts that are associated with multiple exposures, regulators are hamstrung by uncertainty or drawn out delays that seem to ignore the need for urgent action.

We must stop the use of toxic chemicals that are hurting bees. We know that systemic pesticides that enter the plants vascular system and ends up contaminating pollen, nectar, and xylem sap (guttation) droplets are particularly problematic. That's why the European Union in April, under a precautionary law, set a two-year ban on neonicotinoids. But the truth is that our dependency on toxic chemicals in our agricultural and land management systems is killing bees and the life in the soil necessary to support all life. We can use the *BEE Protective Habitat Guide* in this issue to do our part in creating habitat for bees at the same time that we engage our local communities to do the same in their land management practices (parks, playing fields, medium strips, school yards, and parks). Please use our *Keeping Organic Strong* webpage to become a supporter of organic integrity standards and encourage everyone you know to do the same.

The Future

We have a legal structure in place. We have active consumers. We have dedicated farmers. We have increasing numbers of businesses in support. We need an activated public to keep the pieces moving in the right direction.

Now, more than ever, use this issue of *Pesticides and You* and collaborate with Beyond Pesticides.

Jay Feldman is executive director of Beyond Pesticides.

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Fighting Fleas Off Your Canine Companion

Fleas are an epidemic in my town, and my dogs are covered in them! I have tried everything I could think of to try and get rid of them. They were gone for a while but I think they've been picking them up on our lawn from the neighbor's dogs. I hope you all can help me with some least toxic methods for controlling them.
-Laura

Dear Laura,

Thank you so much for contacting Beyond Pesticides.

I hope the following information helps you to get a handle on your pesky flea problem. A good place to start is Beyond Pesticides' fact sheet on Least-Toxic Control of Fleas (http://bit.ly/fleacntrl). This guide provides practical management techniques that can help you avoid resorting to hazardous pesticide use, which can endanger the health of your dogs and family members. Pets take in more pesticides relative to their body weight than adult people do. Due to their natural inclination to sniff and dig in the yard, dogs are more prone to come into contact with pesticide-treated lawns. Beyond Pesticides gets many calls from frantic pet owners whose pets have been poisoned by pesticide treated lawns or flea collars.

However, through a combination of cultural, mechanical, and least-toxic methods, you should be able to prevent flea infestations and, with close surveillance, prevent re-infestation.

Effective cultural practices include vacuuming daily during flea season with a strong vacuum cleaner (and changing the bag often), grooming with a flea comb daily and dunking the comb in soapy water after each stroke, bathing your dogs frequently, and restricting your pets to a single bed if at all possible (it is also good practice to wash the bedding frequently). While these practices require more of a concerted effort than simple broadcast sprays or toxic collars, they are effective if followed closely. If your dog is already infested, there are least-toxic solutions at your local pet store that employ essential oils to kill both fleas and ticks. However, attempt to use these products sparingly by putting an emphasis on prevention.

In terms of suggestions for managing fleas in landscaped areas or turf, although this is difficult, in some cases of severe infestations we recommend the use of beneficial nematodes applied at amounts recommended by the manufacturer. These sprays are available for purchase online through a quick search, but it's always best to check your hardware store first.

For future reference, you may want to take a look at our factsheet *Pesticides and Pets* (http://bit.ly/pesticidepets). It is an excellent guide to the health hazards associated with the use of pesticides around our canine companions.

If you have any further questions, or need any additional information, please don't hesitate to contact Beyond Pesticides again. I hope you will pass these methods and ideas along to your neighbors and friends as we work toward the elimination of hazardous pesticide use.

Staying Safe During "Spray Season"

Beyond Pesticides,

Spring is in bloom and the weather is lovely but it is also what we like to call "spray season" in our neighborhood. Many people are hiring lawn care companies that spray toxic pesticides and use synthetic

Express Yourself

Beyond Pesticides welcomes your questions, comments or concerns. Have something you'd like to share or ask us? We'd like to know! If we think something might be particularly useful for others, we will print your comments in this section. Mail will be edited for length and clarity, and we will not publish your contact information.

There are many ways you can contact us: Send us an email at info@beyondpesticides.org; give us a call at 202-543-5450, or simply send questions and comments to: 701 E Street SE, Washington, DC 20003.

fertilizers. Do you know where I can find a natural lawn care provider, or do you all have any resources we can use to educate our neighbors and show them the danger of using these chemicals?
-Susan

Dear Susan,

We would love to help you raise awareness about the hazards of pesticide use in your neighborhood. A great place to start is our Safety *Source for Pest Management* website (http://bit.ly/SafetySource). On that page, we have a number of organic or least-toxic lawn care providers listed. Please let us know if you find a company that we haven't listed or cannot find one in your area. Beyond Pesticides also provides, free of charge, 25 doorknob hangers which you can use to spread the word in your community. We also have a number of resources on our *Safer Choice* website (http://bit.ly/SaferChoice) that you print out and distribute door-to-door. We encourage you to join together with others in your community, speak with local officials and elected leaders, and work toward the passage of an organic land management policy. For a copy of our model policy, contact Beyond Pesticides at info@beyondpesticides.org, or call 202-543-5450.

From the Web

Beyond Pesticides' Daily News Blog features a post each weekday on the health and environmental hazards of pesticides, pesticide regulation and policy, pesticide alternatives, and cutting-edge science at www.beyondpesticides.org/daily news blog. Want to get in on the conversation? Become a "fan" by "liking" us on Facebook! www.facebook.com/beyondpesticides.

Stop Antibiotic Use in Apple and Pear Production:

From the Beyond Pesticides original blog post (3/19/13). The phase-out of antibiotic use in apple and pear production may continue beyond 2014 unless the public speaks out. Luckily, unlike the closed-door meetings that surround the rulemaking process in other government agencies, organic regulations are unique because they include a key ingredient: you, the public.

Linda R. Comments:

"Please do not extend the use of antibiotics in organic apple and pear production.

If the meaning of "organic" is weakened, the consumer will not only be cheated, but will lose faith in the movement to restore health to our foods. I believe we all need to take definite steps to protect our environment now. –From a Cree Indian Prophecy, "Only after the last tree has been cut down. Only after the last river has been poisoned. Only after the last fish has been caught. Only then will you find that money cannot be eaten."

Public Comment on Pesticide Use Under Attack in Several States

From Beyond Pesticides original blog post (2/25/13). Both current and future pesticide laws are under assault in several states. State-run agencies in Alaska are no longer required to solicit public comments or a review process for pesticide applications on state land due to new regulations adopted by the Alaska Department of Environmental Conservation (DEC).

Katrina R. comments:

"It is so important that we all get involved in some way in each and every state. Where I live it California, it's horrid how much pesticide spraying goes on; in gardens and for termites especially. I have to leave my home each and every month for 4-5 days due to a neighbor's persistent use of a commercial pest control applicator. I tried air filters and masks to no avail. The air is still intolerable to me for the first several days after an application. I tried talking politely with my neighbor and the pest control company and was told that it's his individual right to spray on his property and that these products are safe per the EPA. What about my individual right to protect my health from volatilizing chemicals and pesticide drift? (I am extremely chemically sensitive and even suffered organ damage as a result of past pesticide overexposures.) The EPA registration process is a cost-benefit analysis riddled with conflict of interest, not a safety guarantee."

A "BEE Protective" Call for Honey Bees and Pollinators

With honey bees suffering a devastating decline as high as 90 percent this year, the **BEE Protective** campaign has been launched to support nationwide local action aimed at advancing organic practices to protect honey bees and other pollinators from pesticides. Pollinators are a vital part of the environment, a barometer for healthy ecosystems, and critical to the nation's food production system. The campaign launched on Earth Day when people and communities across the country come together to affirm the importance of protecting the environment for a healthy population and economy.

This grassroots campaign is part of a larger effort to protect bees from rapid declines and Colony Collapse Disorder (CCD) spurred by harmful pesticides. The launch comes one month after beekeepers, Center for Food Safety, Beyond Pesticides, and Pesticide Action Network North America filed a lawsuit against EPA that calls for the suspension of certain neonicotinoid pesticides.

"It is time for us as a community to come together and take action to protect our pollinators from bee-killing pesticides," said Jay Feldman, executive director of Beyond Pesticides. "We are providing the public with the tools needed to make a difference in communities, schools, and homes one landscape at a time — to nurture pollinators and support the essential services they provide."

BEE Protective brings together a variety of educational materials, including a BEE Protective Habitat Guide (which begins on the following page), providing information on creating native pollinator habitat in communities, eliminating bee-toxic chemicals, and other advocacy tools. The campaign also encourages municipalities, campuses, and homeowners to adopt policies that protect bees and other pollinators from harmful pesticide applications and synthetic fertilizer use, and create through organic practices refuges for these beneficial organisms. **BEE Protective** tracks scientific studies and regulatory issues, and includes a model organic community pollinator resolution and a pollinator protection pledge.

"These toxic chemicals are being used without scrutiny in communities across the country, so much so that we're facing a second Silent Spring. A growing number of concerned citizens are ready to step up to protect bees; this new educational campaign will give them the tools they need to have an impact," said Andrew Kimbrell, executive director of Center for Food Safety.

Pesticides, specifically neonicotinoids, have increasingly been linked to bee declines. These chemicals are used extensively in U.S. agriculture, especially as seed treatment for corn and soybeans. Agriculture is not the only concern however, as pesticide applications in home gardens, city parks, and landscaping are also prime culprits in the proliferation of these harmful chemicals. The systemic residues of these pesticides not only contaminate pollen, nectar, and the wider environment, but have repeatedly been identified as highly toxic to honey bees.

With one in three bites of food reliant on bees and other species for pollination, the decline of honey bees and other pollinators demands swift action. Mounting scientific evidence, along with unprecedented annual colony losses at 30 to 90 percent this year, demonstrate the effects that these pesticides are having on fragile species. **BEE Protective** supports a shift away from the use of these toxic chemicals and encourages organic methods and sustainable land management practices.

With the **BEE Protective** campaign, groups urge the public to take action to protect pollinators from pesticide-intensive land management that threatens our environment and food supply.

For more information and to download campaign materials, visit www.BEEprotective.org

BEE Protective Habitat Guide

BEYOND PESTICIDES
Protecting Health and the Environment with Science, Policy and Action
www.beyondpesticides.org

Acknowledgements

The *BEE Protective Habitat Guide* is produced by Beyond Pesticides. Xoco Shinbrot, Jay Feldman and Terry Shistar contributed to this piece. For additional information, or to download the brochure, go to www.BEEprotective.org.

About Beyond Pesticides

Beyond Pesticides is a 501(c)3 nonprofit organization headquartered in Washington D.C. Our directors and staff are experienced scientists, conservationists, and activists. We work to provide the public with useful information on pesticides and alternatives to their use. With these tools, people can protect themselves and the environment from the hazards pesticides pose to public health and the environment.

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Select Resources

Beyond Pesticides. BEE Protective: http://www.beyondpesticides.org/pollinators
Center for Food Safety. http://www.centerforfoodsafety.org
Honeybee Haven Pledge: http://www.honeybeehaven.org
Ladybird Johnson Wildflower Center. http://www.wildflower.org
Pesticide Action Network North America: http://www.panna.org
USDA Plant Hardiness Zone Map: http://planthardiness.ars.usda.gov/PHZMWeb
US Forest Service. Pollinators. http://www.fs.fed.us/wildflowers/pollinators
The Xerces Society for Invertebrate Conservation: http://www.xerces.org

Member of EarthShare

The Purpose of this Guide

This guide is designed to provide information on pollinators with resources on pollinator-friendly habitat, as well as pesticide use that contributes to declines in pollinator health. To that end, the wildflower section contains perennial species that are known to nurture bee populations in to the U.S. The guide is divided into several sections and is arranged by season of interest to encourage gardeners and land managers to plant flowers that will bloom all year round. Within each season, plants are arranged in alphabetical order by common name. Bloom months have been provided and are rated based on when they commonly begin to bloom in the Midwest. Some species may continue blooming later into the season depending on the location. Note that plant hardiness should be referenced against the USDA Plant Hardiness Zone Map, found at bit.ly/PlantHardiness.

While this guide provides botanical names for the flower species, often the entire genus or family is considered bee-friendly. For example, aromatic aster, *Symphyotrichum oblongifolium*, is bee-friendly along with almost all other asters.

The Importance of Pollinators

With one in three bites of food reliant on honey bee pollination, threats to pollinator populations affect the entire food system. While honey bees are perhaps the best known pollinators in the world and the primary domesticated pollinators, they are by no means solely responsible for the pollination of all flowering plants. In gardens, farms, and wild settings, native pollinators play an essential role in plant reproduction and food production.

Wild pollinators, including bees, wasps, beetles, flies, butterflies, moths, birds, bats, and even some non-flying mammals, have suffered due to human impacts, such as habitat destruction and fragmentation, pesticide use, land management practices, and the introduction of non-native species and pathogens. Meanwhile, heated debate surrounds the causes of so-called "Colony Collapse Disorder," a general term for bee disappearance, death, and the abandonment of hives.

A May 2012 study by Cornell University found that insect pollination results in a value of more than $15 million annually. A single beekeeper pollinating almonds, blueberries, pumpkins, apples, and cherries provides a total estimated $5 million annual value to the agricultural economy from pollination services and crop production.

U.S. Crops	Crop Value (2010)*	Pollinator Reliance**
Apples	$2.2 billion	100%
Almonds	$5.4 billion	100%
Avocados	$377 million	100%
Cherries	$736 million	90%
Nectarines and Peaches	$753 million	60%

FAO Stat (2010);Morse & Calderone (2000)*

Insect pollinator populations are in serious decline. With annual hive losses averaging over 30 percent since 2006, beekeepers, activists, and the public alike fear that the beekeeping industry is on the verge of collapse. Safe havens, like organically tended yards, gardens, parks, and landscapes, are needed now more than ever. This guide provides the tools you need to do just that and much more.

> *"A significant and constant decline in domestic honey bee colony numbers has been occurring during the past decades in North America ...with fewer managed pollinators than at any time in the last 50 years."*
> *-United Nations Environment Programme (2010)*

Colony Collapse Disorder and Pollinator Declines

Colony Collapse Disorder, or CCD, and its mysterious decline of honey bee populations around the world became widespread after the introduction of neonicotinoid pesticides. These systemic pesticides are taken up by the plant's vascular system and expressed through nectar, pollen, and guttation droplets (formed by xylem sap exuded from plant surfaces).

Each winter since 2006, one-third of the U.S. honey bee population has died off or disappeared (more than twice the normal rate). While CCD appears to have multiple interacting causes, including pathogens and parasites, a range of evidence points to sublethal pesticide exposures as an important contributing factor. Key symptoms of CCD include: 1) inexplicable disappearance of the hive's worker bees; 2) presence of the queen bee and absence of invaders; and 3) presence of food stores and a capped brood (developing bees).

Pesticides commonly found in lawn and garden products and used in agriculture are known to be hazardous to bees –some killing bees outright and others with subtle effects that reduce a bee's ability to thrive. Risk mitigation measures on pesticide product labels, which are intended by regulators to protect bees, fall short for managed bees as well as other pollinators, such as bumblebees, that have different foraging practices, social structures, and genetics.

Role of Pesticides in Pollinator Decline

Pesticides are an important contributor to the decline of pollinators because of their acute and chronic effects. Bees foraging and pollinating are exposed to pesticides as a result of direct application to crops and plants, drift from spraying and volatilization, and the uptake from treated seeds of toxic chemicals that move systemically through the plant. In addition to the contamination of pollen and nectar, the plants' guttation droplets, a source of hydration for bees, is another route of exposure. Regardless of the exposure pattern, residual pesticide contamination can persist for extended periods.

Effects, including impaired reproduction, compromised immune function, and degraded ability to forage and navigate, have been linked to low level pesticide exposure. The decline in honey bee populations has been exacerbated by pesticides that weaken the immune system of bees, making them more susceptible to bacteria, viruses, and mites that prey on them.

While many toxic pesticides are applied in chemical-intensive agricultural production to crops where commercial beekeepers have contracted their bees for the purpose of pollination, the exposure problem is equally problematic in non-insect pollinated crops. Pollinators are also exposed while foraging nectar or pollen from non-insect pollinated crops, such as corn, cotton, and soybeans. In these crops, pesticides are routinely applied as seed treatments, granular applications, and as foliar spraying during their growing season.

The pollinator decline from pesticides exemplifies deficiencies with the pesticide registration program overseen by the U.S. Environmental Protection Agency (EPA) under the *Federal Insecticide Fungicide and Rodenticide Act*, the nation's pesticide control law. The program's reliance on industry-funded science and the lack of attention to sublethal chronic exposure raises serious concerns, given independent scientific findings on pesticides' effects on bees.

The pesticides discussed below have been identified in the scientific literature as extremely hazardous to bees.

Pesticides Associated with Bee Declines

Many pesticides are not only considered highly toxic to bees, but some, such as neonicotinoids, are persistent in the soil and environment for days after application. While not an exhaustive list, the pesticides primarily responsible for bee poisoning are in the following chemical families:

1. **Neonicotinoids** are a relatively new class of insecticide used in agriculture, for indoor and outdoor insect control, home gardening and pet products. Studies show that neonicotinoids, such as imidacloprid, clothianidin, and thiamethoxam, produce sublethal effects in honey bees, including disruptions in mobility, navigation, reproduction, and feeding behavior.
2. **Synthetic pyrethroids** are considered highly toxic to bees, with demonstrable impacts that cause paralysis and eventually death. Sublethal impacts include impaired ability to learn, forage, and reproduce.
3. **Other active ingredients** that are dangerous to pollinator health and to the environment include: fipronil, a widely used ingredient in indoor and turf pest management; organophosphates, which are among the most widely used agricultural pesticides worldwide; and carbamates, which are also highly toxic to bees.

To report a suspected bee poisoning incident, contact your state Department of Agriculture or Department of Pesticide Regulation. They are in charge of investigating pesticide-related problems. Note that often state lead agencies do not relay bee kill information, so be sure to contact EPA as well at beekill@epa.gov. Finally, report the bee kill incident to the National Pesticide Information Center at 1-800-858-7378.

Active Ingredient	Effects	Sample Products
Imidacloprid	Neurotoxic, reproductive and mutagenic effects, toxic to bees, birds and beneficial insects	e.g. Merit® Insecticides, All-in-one Rose and Flower Care
Clothianidin	Neurotoxic, toxic to fish, highly toxic to bees	e.g. ALOFT® insecticides, ARENA® insecticides
Thiamethoxam	Reproductive effects, causing liver and kidney damage, toxic to bees	e.g. Flagship®
Fipronil	Possible carcinogen, hormone disruptor, neurotoxic, toxic to bees	e.g. Combat, Termidor

Regulatory Action on Pollinator Protection

Which regulatory agencies are working to protect pollinators? Broadly, the U.S. Department of Agriculture (USDA) leads the federal government response to Colony Collapse Disorder (CCD), while EPA's role is to keep abreast of and help advance research investigating pesticide effects on pollinators, and requiring restrictions in response. USDA, EPA, beekeepers, environmentalists, industry, and academia are working on different pieces of the bee decline issue. Critics of the regulatory process point to inadequate data on pesticide impacts on bees and the lack of meaningful field studies prior to a pesticide's use, and a lack of responsiveness to the independent science linking pesticides to declining bee health.

Inadequacy of Regulations

The disappearance of bees alerts us to a fundamental and systemic flaw in our approach to the use of toxic chemicals –and highlights the question as to whether our risk assessment approach to regulation will slowly but surely cause irreversible harm unless there is a meaningful change of course. While admittedly uncertain and filled with deficiencies, risk assessments establish unsupported thresholds of allowable chemical contamination of the ecosystem, despite the availability of non-toxic alternative practices and products. Why do we allow chemical-intensive agriculture and land management when organic practices, which eliminate the vast majority of hazardous substances, are commercially viable?

Action to Support Pollinators

To challenge government inaction, groups are joining together to educate and push for regulation to protect bees from pesticides. In alliance with beekeepers and concerned people, we have generated discussion, developed educational materials, sued EPA, and created model policies to provide a solution to the problem. The time for decisive action is now and we need your help! Ways to protect pollinators include:

1. Create a Pollinator Friendly Garden

Honey bees and wild pollinators desperately need a refuge to protect themselves from pesticide contamination: backyard pollinator-friendly gardens fill that role. But just like flowers, pollinators come in all shapes and sizes, using their specific traits, like tiny hairs or feathers, to transfer pollen grains from one flower to another.

To develop a pollinator-friendly habitat, consider the three basic needs of pollinators: protection from pesticides, a source of food and water, and a sheltered place to lay their eggs.

a. Eliminate the use of toxic pesticides. Pesticides kill beneficial organisms, like bees, that provide important ecosystem services. Use instead organic soil management, pest prevention, and least toxic practices. (See alternatives section.)

b. Plant a variety of flowers that bloom at different times. These flowers will provide nectar and pollen for pollinators that will sustain them throughout the year.

c. Support a range of nest sites. Butterflies lay eggs on food plants for their young, while wild bees often create nests underground.

Provide a variety of habitats to accommodate a range of pollinator tastes: hummingbirds, for instance, prefer tubular shaped flowers where they can take advantage of their long beak, while bees are attracted to yellow, blue, or white flowers. The table below of pollinator traits can be used to choose flowers for all types of pollinators.

2. Use Alternatives

Eliminating hazardous pesticide use is central to conserving pollinators. Before reaching for a toxic product, it's best to start with healthy soil. If you manage your garden organically, by incorporating compost and supporting soil microorganisms, you will be able to prevent major pest problems. For detailed information, see Beyond Pesticides' *Grow Your Own Organic Garden* at: bit.ly/GrowOrganic. Most pesticides, including neonicotinoids, can immediately kill bees or have sublethal effects that impact reproduction and foraging. Even least-toxic pesticides may impact bees, so proper timing and location of application is important. Particularly, they should not be applied while plants are blooming or during mid-day while pollinators are foraging. The following list includes pesticides that are considered least-toxic by Beyond Pesticides and acceptable for use as a last resort. It is important to remember that pesticides listed in this category still have the potential to harm the environment.

a. **Fatty acid soaps/ insecticidal soaps:** Commonly used soaps containing potassium and coconut oil are effective in controlling many soft-bodied insects, such as aphids, caterpillars, crickets, fleas, flies, and mites.
b. **Biological oils and herbal repellents:** These oils and extracts are effective in controlling aphids, adelgids, spider mites, mealy bugs, sawfly larvae, whiteflies, plant bugs, caterpillars, scales, and some plant diseases like rusts and mildews. Some materials in this category include garlic and pepper extracts, neem, sabadilla, and tea tree oil.
c. **Microbe-based pesticides:** Certain microbes are effective in controlling insect, fungus, and plant pest problems and are virtually non-toxic. Microbial pesticides contain living microorganisms or the toxins they produce as active ingredients. Examples include Bioblast, B.t./B.t.i. and milky spore disease.

For more information, visit Beyond Pesticides' *Least-Toxic Control of Pests in the Home and Garden* page at: bit.ly/LeastToxicPestMgmt.

3. Go Organic to Protect Pollinators

Protecting pollinators is just one of the many reasons to plant a garden and eat organic food. Beyond Pesticides' *Gateway on Pesticide Hazards and Safe Pest Management*, bit.ly/PesticideGateway details which pesticides are toxic to bees and other wildlife, providing another reason to grow, eat, and buy organically.

	Bees	Birds	Bats	Butterflies	Moths
Color	Bright white, blue, or yellow	Scarlet, orange, red, or white	Dull white, green or purple	Bright with purples, reds	Pale and dull to dark brown & purple
Odor	Fresh, Mild	Absent	Strong, Musty	Faint but fresh	Strong, sweet
Nectar	Present	Ample	Ample	Ample	Ample
Pollen	Limited	Modest	Ample	Limited	Limited
Flower Shape	Shallow, with landing platform, tubular	Large funnel-like, strong perch	Regular, bowl shape	Narrow tube with spur, large pads	Regular, tubular without lip

4. Pledge Your Yard

By pledging your yard or park as a Pesticide Free Zone, you are showing your support for pesticide-free spaces that are important for human health, the environment, and bees. To pledge your land as a pollinator-friendly, pesticide-free zone, visit our website at: bit.ly/pollinatorPFZ.

5. Become a Beekeeper

There is also the option of keeping your very own colony of bees in your backyard. Although not all bees live in hives, honey bees are easily and safely kept in artificial hives for their shelter. This provides a safe haven for the bees while also allowing you a fresh and local supply of honey. If you are interested in keeping honey bees, find a local beekeeping club in your area. Most clubs either offer courses in basic beekeeping or can direct you to such courses. These are often given at the beginning of the year, in order to prepare people to start their hives in the spring.

6. Be an Activist in your Community

Organizing a campaign in your community is a forceful way to stand up for the rights of pollinators, and our right to a healthy environment. By reaching for support from family, friends and neighbors, you can involve them in the pesticide and pollinator conversation. Talk about the threats that pesticides pose to bees and to our food systems. Contact local groups that might be interested in your efforts, as well as those of beekeeping organizations, environmental groups, and garden clubs.

Other actions you can take include: community outreach, such as gathering signatures for a petition, distributing educational materials, tabling at community events at schools or religious institutions, developing a community report to provide evidence of the need for change; and proposing a policy with your research to your local elected officials and government. See model policy at www.BEEprotective.org.

7. Urge Your Representative to Act

Congress has the authority to exercise oversight over federal agencies like EPA. We will continue to pressure EPA to take action on pesticides that are hurting bees. Please contact your U.S. Representative and Senators and urge them to act to protect pollinators.

8. Demand that EPA Act

While EPA denied in 2012 the petition identifying the "imminent hazard" that bees face from the systemic pesticide clothianidin, we continue to seek the suspension of pesticides linked to declining bee health and CCD, with over one million citizen petition supporters worldwide. Inaction puts beekeepers, rural economies, and the food system at risk. With hives averaging losses over 30%, bees are crying out for help. Tell EPA to act now! Send an email to the current EPA Administrator following the formula: lastname.firstname@epa.gov.

Spring & Early Summer Pollinator-Friendly Flowers

Bring in the roses, cherry trees, and plum trees! Spring and early summer is when these plants are in full blossom, alerting bees and pollinators that winter is finally over. The first flowers to appear each spring are especially valuable since they help to establish a resident bee population that is needed throughout the growing season. The plants mentioned here are among the earliest blooming plants each spring. They are perennial and their flowers are small and clustered. Compact flowering plants, like golden currants or heather, can have scores of bees pollinating one plant all at the same time.

Blanket Flower
Botanical Name: ***Gaillardia aristata***
Bloom Time: April-June
Pollinators: Bees, Butterflies
Water Use: Moderate
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: All of the U.S.

Karelj [Photographer] 2008. Flower Gaillardia aristata in Prague Botanic Garden, Prague, Troja. Available at: http://commons.wikimedia.org

American Plum
Botanical Name: ***Prunus americana***
Bloom Time: April, May
Pollinators: Bees, bumblebees, honeybees
Water Use: Moderate
Light: Full Sun, Part Shade, Shade
Flower Color: White
Plant Type: Perennial
Region: All of U.S.

IPFW. 2010. American Plum. Available at: http://www.ipfw.edu/native-trees/AmericanPlumIconGallery.htm

Chokecherry
Botanical Name: ***Prunus virginiana***
Bloom Time: April-June
Pollinators: Bees, Moths, Butterflies
Water Use: Moderate
Light: Full Sun, Part Shade, Shade
Flower Color: White
Plant Type: Perennial
Region: All of the U.S.

Oregon State University. 2003. Common Chokecherry. Available at: http://www.malag.aes.oregonstate.edu

American Vetch
Botanical Name: ***Vicia americana***
Bloom Time: May-July
Pollinators: Wild bees
Water Use: Low
Light: Full Sun
Flower Color: Purple
Plant Type: Perennial
Region: All but southern U.S.

Bud [Photographer]. American Vetch. Available at: http://askbud.ca

Clasping Coneflower
Botanical Name: ***Dracopis amplexicaulis***
Bloom Time: April-July
Pollinators: Bees, Butterflies
Water Use: High
Light: Part Shade
Flower Color: Yellow
Plant Type: Annual
Region: Southern U.S.

Abbot, L. [Photographer] 2012. Clasping Coneflower. Available at: http://www.lucysinthegarden.com

Daisy Fleabane
Botanical Name: *Erigeron strigosus*
Bloom Time: April, May
Pollinators: Wild Bees
Water Use: Moderate
Light: Full Sun
Flower Color: White
Plant Type: Perennial, Annual, Biennial
Region: All of the U.S.

Brenan, L. [Photographer] 2008. Daisy Fleabane. Available at http://upload.wikimedia.org

Lyrate Rockcress
Botanical Name: *Arabis lyrata*
Bloom Time: April, May
Pollinators: Butterflies
Water Use: Low
Light: Part Sun
Flower Color: White
Plant Type: Perennial
Region: Eastern and Central U.S.

Gunnar, A. [Photographer]. 2012. Lyrate rockcress. Available at: http://www.projectnoah.org/spottings/10330452

Foxglove Beard Tongue
Botanical Name: *Penstemon digitalis*
Bloom Time: May-June
Pollinators: Bees, Moths, Butterflies
Water Use: Moderate
Light: Part Shade
Flower Color: White
Plant Type: Perennial
Region: Eastern and Central U.S.

Per's Wildflower Pictures. 2007. Foxglove Beardtongue. Available at: http://perverdonk.com

Ohio Spiderwort
Botanical Name: *Tradescantia ohiensis*
Bloom Time: May-August
Pollinators: Native Bees, Bumblebees
Water Use: Low
Light: Part Shade
Flower Color: Red, Blue
Plant Type: Perennial
Region: Eastern and Central U.S.

Turnbull, L. [Photographer]. Ohio Spiderwort. Available at: https://npsot.org/TrinityForks/TrinityForksWeb/Descriptions/Wildflowers/Ohio%20Spiderwort.html

Golden Currant
Botanical Name: *Ribes aureum*
Bloom Time: April-July
Pollinators: Hummingbirds, Bees, Butterflies
Water Use: Low
Light: Part Sun
Flower Color: Yellow
Plant Type: Perennial
Region: All but southern U.S.

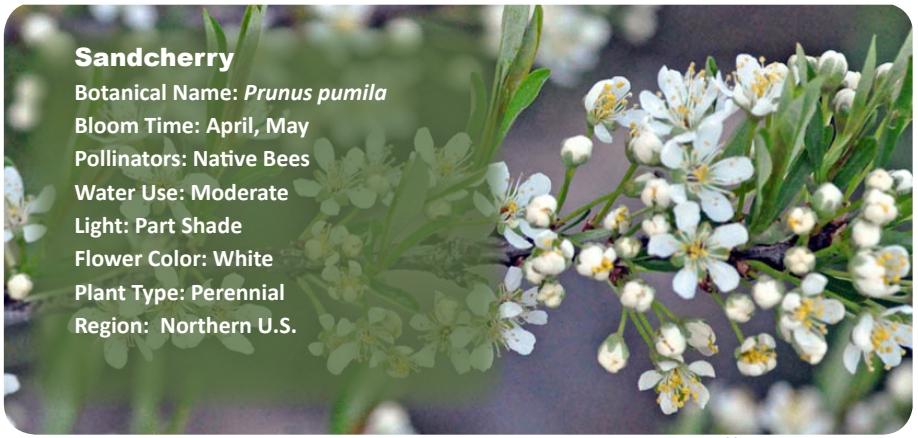
Shock, C. [Photographer] 2008. Golden Currant. Available at: http://www.malag.aes.oregonstate.edu

Prairie Rose
Botanical Name: *Rosa arkansana*
Bloom Time: April-September
Pollinators: Insects, Bees, Butterflies
Water Use: Low
Light: Full Sun
Flower Color: Pink
Plant Type: Perennial
Region: Central US

Shepherd, A.J. [Photographer] 2010. Arkansas rose. Available at: http://aubreyshepherd.blogspot.com

Prickly Wild Rose
Botanical Name: *Rosa acicularis*
Bloom Time: June, July
Pollinators: Bees, Bumblebees, Hummingbirds
Water Use: High
Light: Full Sun, Part Shade
Flower Color: Pink, White
Plant Type: Perennial
Region: Northern U.S.

Fungus Guy [Photographer]. 2011. Wild Prickly Rose. Available at: http://upload.wikimedia.org



Sandcherry
Botanical Name: *Prunus pumila*
Bloom Time: April, May
Pollinators: Native Bees
Water Use: Moderate
Light: Part Shade
Flower Color: White
Plant Type: Perennial
Region: Northern U.S.

Fiddlehead Creek. 2012. The eastern sandcherry. Available at: http://fiddleheadcreek.com

Red Flowering Currant
Botanical Name: *Ribes sanguineum*
Bloom Time: March, April
Pollinators: Bees, Hummingbirds
Water Use: Moderate
Light: Part Sun
Flower Color: White, Red, Pink
Plant Type: Perennial
Region: West Coast U.S.

Walter Siegmund [Photographer] 2008. Ribes sanguineum var. sanguineum. Available at: http://commons.wikimedia.org

Scarlet Gaura
Botanical Name: *Gaura coccinea*
Bloom Time: May-August
Pollinators: Bees, Moths
Water Use: Low
Light: Full Sun
Flower Color: Red, White
Plant Type: Perennial
Region: Central and Western U.S.

Ghostdial Press [Unknown photographer] 2008.Guara. Available at: http://www.wildflowerchild.info

Rosemary
Botanical Name: *Rosmarinus officinalis*
Bloom Time: February-April
Pollinators: Bees, Bumblebees
Water Use: Low
Light: Full Sun
Flower Color: Blue, White, Violet
Plant Type: Perennial
Region: All of the U.S.

Robertson, Clinton & Charles, [Photographers]. 2007 Rosemary, Texas A&M University Horticultural Garden, College Station, TX. 2007. Available at: http://commons.wikimedia.org

Scarlet Globemallow
Botanical Name: *Sphaeralcea coccinea*
Bloom Time: April-September
Pollinators: Native Bees
Water Use: Low
Light: Full Sun
Flower Color: Red, Orange
Plant Type: Perennial
Region: Central and Western U.S.

Globemallow, Red False Mallow, Cowboy's Delight, Sphaeralcea coccinea. Available at: http://www.nps.gov

Large Penstemon
Botanical Name: *Penstemon grandiflorus*
Bloom Time: May, June
Pollinators: Native Bees, Bumblebees
Water Use: Low
Light: Full Sun
Flower Color: Pink, Purple
Plant Type: Perennial
Region: Central U.S.

JEllen. [Photographer]. 2010. [Untitled photo of large penstemon] http://jellenblackhills.blogspot.com

Mid-Summer Pollinator-Friendly Flowers

Bumblebees, one of the hardest working pollinators, collects food during mid-summer to produce a new queen in late summer. Unfortunately, a prolonged shortage of flowers, and thus food, commonly occurs during mid-summer, which drastically impairs the ability of the colony to produce queens. Farmers and gardeners can benefit from growing a succession of flowering plants throughout summer. Attention to planting flowers that last season-long will support bumble bee nutrition, increase queen production and, ultimately, improve the long term viability of pollinators. Mid-summer is the time to enjoy the conehead flowers, mints and herbs, daisies, and sunflowers.

Skunkbush Sumac
Botanical Name: *Rhus trilobata*
Bloom Time: April, May
Pollinators: Native Bees
Water Use: Low
Light: Full Sun, Part Shade
Flower Color: White, Yellow
Plant Type: Perennial
Region: Central and Western U.S.

St. Charles, C. [Photographer]. 2011. Skunkbush Sumac. Available at: http://cynthia-stcharles.blogspot.com

Black-Eyed Susan
Botanical Name: *Rudbeckia hirta*
Bloom Time: June-October
Pollinators: Honeybees, Butterflies, Birds
Water Use: Moderate
Light: Full Sun, Part Shade, Shade
Flower Color: Yellow
Plant Type: Annual
Region: All of the U.S.

Barotz, S., and Bilodeau, C. [Photographers]. 2004. Black-eyed Susan. Available at: http://www.bio.brandeis.edu

Western Yarrow
Botanical Name: *Achillea millefolium*
Bloom Time: April-September
Pollinators: Native Bees
Water Use: Moderate
Light: Full Sun, Part Shade
Flower Color: White, Yellow
Plant Type: Perennial
Region: Central and Western U.S.

Ghostdial Press [Unknown photographer] 2008. Yarrow97. Available at: http://www.wildflowerchild.info/

Black Samson
Botanical Name: *Echinacea angustifolia*
Bloom Time: May-July
Pollinators: Native Bees, Butterflies
Water Use: Low
Light: Full Sun, Part Shade
Flower Color: Pink, Purple
Plant Type: Perennial
Region: Central U.S.

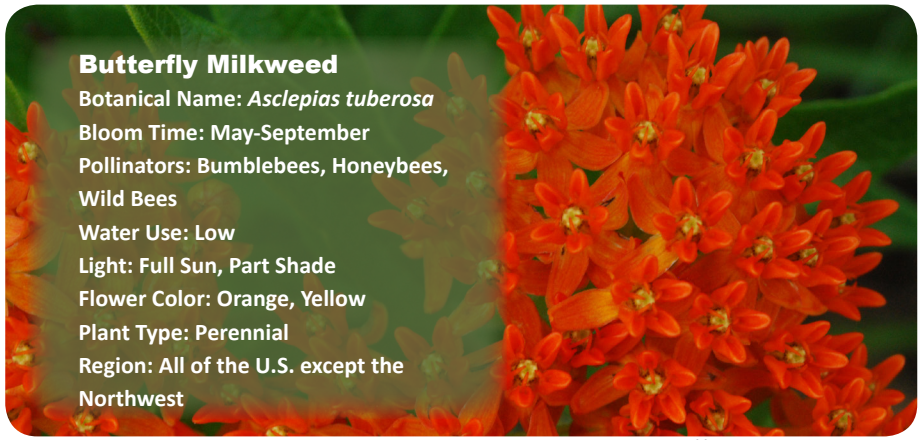
Lorenzos Seeds. Black Samson. http://www.lorenzsokseedsllc.com/perennials-the-backbone-of-your-garden

Blue Vervain
Botanical Name: *Verbena hastata*
Bloom Time: June-September
Pollinators: Native Bees, Butterflies, Moths Water Use: High
Light: Full Sun, Part Shade
Flower Color: Blue, Purple
Plant Type: Biennial
Region: All of the U.S.

IPFW. 2010. Blue Vervain. http://www.ipfw.edu/native-trees/images/Verbena,%20Blue,%20Flower78.JPG/

Canadian Milkvetch
Botanical Name: *Astragalus canadensis*
Bloom Time: May-July
Pollinators: Native Bees, Bumblebees, Butterflies
Water Use: Moderate
Light: Full Sun, Part Shade
Flower Color: White
Plant Type: Perennial
Region: Eastern and Central U.S.

MillbornSeeds. 2012. Canada Milkvetch. http://blog.millbornseeds.com/



Butterfly Milkweed
Botanical Name: *Asclepias tuberosa*
Bloom Time: May-September
Pollinators: Bumblebees, Honeybees, Wild Bees
Water Use: Low
Light: Full Sun, Part Shade
Flower Color: Orange, Yellow
Plant Type: Perennial
Region: All of the U.S. except the Northwest

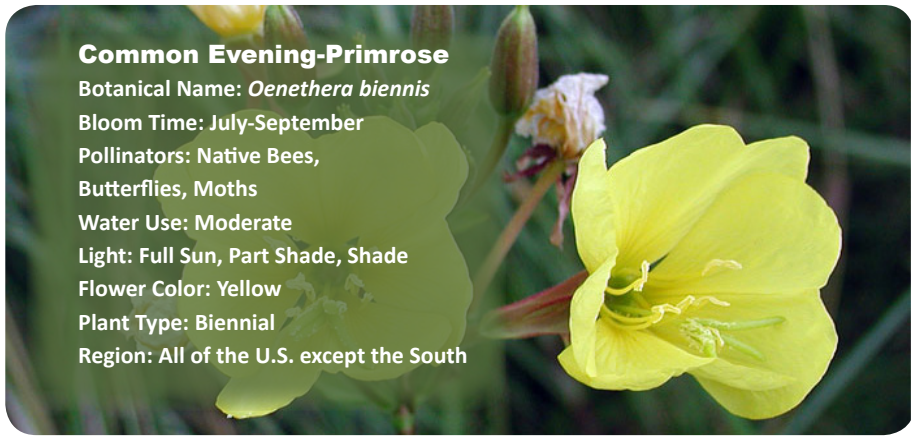
Mayer, J. [Photographer]. 2011. Butterfly Milkweed. http://commons.wikimedia.org

Canada Tick-Trefoil
Botanical Name: *Desmodium canadense*
Bloom Time: June-September
Pollinators: Hummingbirds, butterflies, bees Water Use: Moderate
Light: Full Sun
Flower Color: Pink, Purple
Plant Type: Perennial
Region: Central and Northern U.S.

WackyBadger (Photographer). Canada tick-trefoil (Desmodium canadense). Available at: http://www.photoree.com/photos/permalink/9401921-8584048@N05

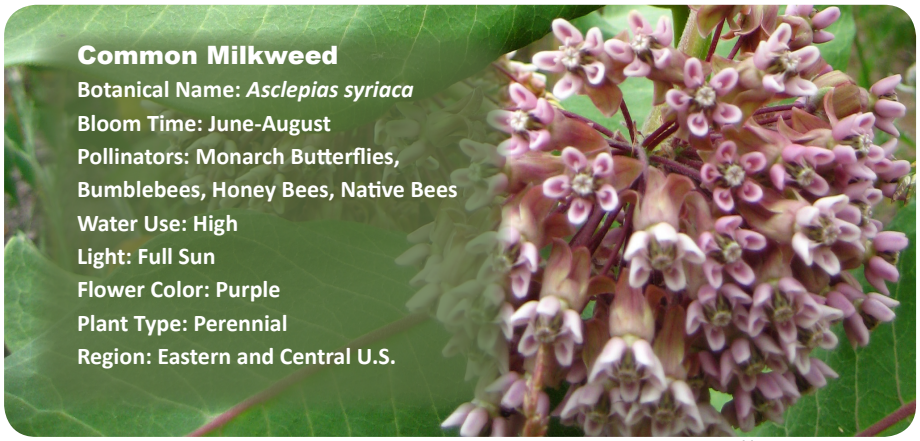
Candle Anemone
Botanical Name: *Anemone cylindrica*
Bloom Time: May, June
Pollinators: Native Bees
Water Use: Moderate
Light: Full Sun, Part Shade
Flower Color: White, Green, Brown
Plant Type: Perennial
Region: Northern U.S.

Whittemore, J. [Photographer]. 2011. Candle Anemone. Available at: http://ecologyofappalachia.blogspot.com



Common Evening-Primrose
Botanical Name: *Oenethera biennis*
Bloom Time: July-September
Pollinators: Native Bees, Butterflies, Moths
Water Use: Moderate
Light: Full Sun, Part Shade, Shade
Flower Color: Yellow
Plant Type: Biennial
Region: All of the U.S. except the South

Llewellyn, P. [Photographer]. 2011. Common Evening Primrose. http://www.thewildflowersociety.com



Common Milkweed
Botanical Name: *Asclepias syriaca*
Bloom Time: June-August
Pollinators: Monarch Butterflies, Bumblebees, Honey Bees, Native Bees
Water Use: High
Light: Full Sun
Flower Color: Purple
Plant Type: Perennial
Region: Eastern and Central U.S.

Vannette, R. [Photographer] 2011. A common milkweed in flower. Available at: http://www.ns.umich.edu

Grayhead Coneflower
Botanical Name: *Ratibida pinnata*
Bloom Time: May-September
Pollinators: Birds, butterflies, bees
Water Use: Moderate
Light: Full Sun, Part Shade
Flower Color: Yellow
Plant Type: Perennial
Region: Eastern and Central U.S.

Jeannelle [Photographer]. 2010. Grayhead Coneflower. Available at: http://midlifebyfarmlight.blogspot.com

False Sunflower
Botanical Name: *Heliopsis helianthoides*
Bloom Time: June-September
Pollinators: Hummingbirds
Water Use: Moderate
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Eastern and Central U.S.

BotBln. 2011. Heliopsis helianthoides. Available at: http://commons.wikimedia.org

Great Blue Lobelia
Botanical Name: *Lobelia siphilitica*
Bloom Time: July-October
Pollinators: Bumblebees, Native Bees, Hummingbirds
Water Use: High
Light: Full Sun, Part Shade, Shade
Flower Color: Blue
Plant Type: Perennial
Region: Eastern and Central U.S.

Quick Growing Trees. 2012. Great Blue Lobelia. Available at: http://www.gonative.4t.com

Fireweed
Botanical Name: *Chamerion angustifolium*
Bloom Time: July-September
Pollinators: Bees, Moths, Hummingbirds
Water Use: High
Light: Full Sun
Flower Color: Pink
Plant Type: Perennial
Region: Western and Eastern U.S.

Williams, H.B. 2011. Dwarf Fireweed. Available at: http://vevelshemor.com

Hoary Vervain
Botanical Name: *Verbana stricta*
Bloom Time: July-September
Pollinators: Bees
Water Use: Low
Light: Full Sun
Flower Color: Purple
Plant Type: Annual
Region: All of the U.S.

Mayer, J. [Photographer] 2011. Hoary Vervain aka Verbena stricta Available at: http://commons.wikimedia.org

Dehaan [Photographer] 2008. Illinois bundleflower (Desmanthus illinoensis) inflorescence. Available at: https://commons.wikimedia.org

Miggel, C. [Photographer]. 2012. The Linden Realm. http://cathelijnemiggelbrink.blogspot.com/

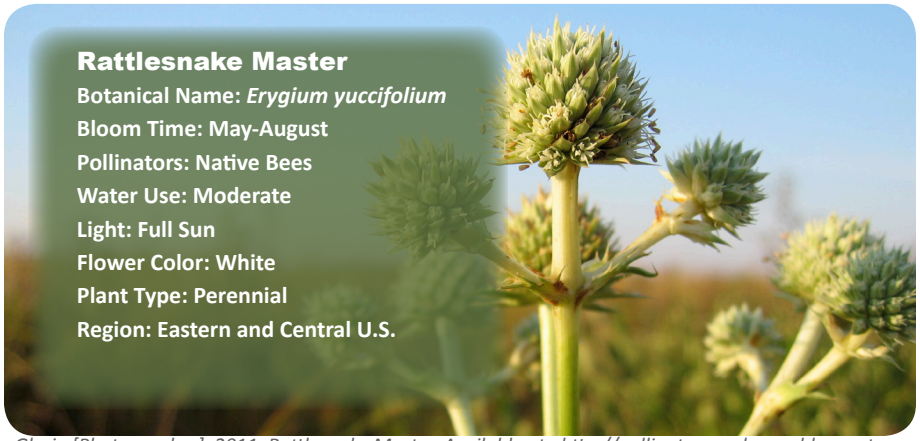
Hellen [Photographer]. 2011. Lanceleaf Coreopsis. http://middlewoodjournal.blogspot.com

Sandia Net. 2007. Pale Purple Coneflower. Available at: http://www.sandianet.com

Percy, I. [Photographer] 2010. Lemon beebalm. Available at: http://floreznursery.blogspot.com/2010/12/monarda-citriodora-lemon-beebalm.html

Lewis, C. [Photographer] 2007. plains Coreopsis. Available at: https://commons.wikimedia.org

Gorman, P. 2010. Prairie Cinquefoil. Available at: http://swbiodiversity.org/seinet/imagelib/imgdetails.php?imgid=294481



Gloria [Photographer]. 2011. Rattlesnake Master. Available at: http://pollinators-welcome.blogspot.com

Nebraska Pheasants & Quail Forever. 2012. Penstemon & cudweed. Available at: http://www.nebraskapf.com

Shock, C. [Photographer]. Rocky Mountain Beeplant. Available at: http://www.malag.aes.oregonstate.edu/wildflowers/images/RockyMountainBeeplantCleomeSerrulata15Aug06MalheurRivPlainOR_07.JPG

Hansel, B. [Photographer]. 2005. Prairie Clover. Available at:http://en.wikipedia.org

Lavin, M. [Photographer] 2007. Asclepias speciosa. Available at: https://commons.wikimedia.org

Sensitive Briar
Botanical Name: *Mimosa microphylla*
Bloom Time: April-July
Pollinators: Bees
Water Use: Low
Light: Full Sun
Flower Color: Pink
Plant Type: Perennial
Region: Southern U.S.

Wolf-Root, D. [Photographer]. 2013. Sensitive Briar. Available at: http://www.worldisround.com/articles/369337/photo6.html

Upright Prairie Coneflower
Botanical Name: *Ratibida columnifera*
Bloom Time: May-October
Pollinators: Honeybees, Butterflies, Insects
Water Use: Moderate
Light: Full Sun
Flower Color: Orange, Yellow, Brown
Plant Type: Perennial
Region: All of the U.S.

Stickpen [Photographer]. 2009. Ratibida columnifera. Available at: http://en.wikipedia.org/

Showy Partridge-Pea
Botanical Name: *Chamaecrista fasciculata*
Bloom Time: May-October
Pollinators: Native Bees, Bumblebees
Water Use: Moderate
Light: Full Sun, Part Shade
Flower Color: Yellow
Plant Type: Annual
Region: Eastern and Central U.S.

Crazytwoknobs [Photographer] 2008. Partridge Pea, Schaumburg IL. Available at http://en.wikipedia.org

Virginia Mountain Mint
Botanical Name: *Pycnanthemum virginianum*
Bloom Time: July-August
Pollinators: Bumblebees, Honeybees
Water Use: Moderate
Light: Part Shade
Flower Color: White
Plant Type: Perennial
Region: Eastern and Central U.S.

Shiela [Photographer]. 2011. Virginia Mountain Mint. Available at: http://greenplace-chapelhill.blogspot.com

Stiff Sunflower
Botanical Name: *Helianthus pauciflorus*
Bloom Time: July-September
Pollinators: Native Bees
Water Use: Low
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Central and Western U.S.

Lavin, M. [Photographer]. 2004. Helianthus pauciflorus. http://commons.wikimedia.org

Western Ironweed
Botanical Name: *Vernonia baldwinii*
Bloom Time: July-November
Pollinators: Bees, Birds, Butterflies
Water Use: Low
Light: Full Sun
Flower Color: Pink, Purple
Plant Type: Perennial
Region: Central U.S.

Indiana Department of Natural Resources [Photographer]. 2011. Ironweed at Clifty Falls State Park. Available at: http://bit.ly/13NTKNW

Western Sunflower
Botanical Name: *Helianthus occidentalis*
Bloom Time: June, July
Pollinators: Native Bees, Birds, Butterflies
Water Use: Moderate
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Southwestern U.S.

Hess, D. [Photographer]. 2006. Helianthus occidentalis. Available at: http://www.cas.vanderbilt.edu

Late Summer and Fall Pollinator-Friendly Flowers

The late summer and fall season seems to indicate a slow-down for bees. In fact though, autumn flower gardens can continue to provide food and shelter for bees, pollinators, and wildlife at a time when it may be otherwise scarce. Several flowers, like asters, echinacea, goldenrod, and even sunflower, continue to bloom right up through the end of October, giving bees a good supply of pollen and nectar during the cold winter weather.

Wholeleaf Rosinweed
Botanical Name: *Silphium integrifolium*
Bloom Time: July-September
Pollinators: Native Bees, Bumblebees
Water Use: Moderate
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Central U.S.

IPFW. 2008. Rosinweed. Available at: http://www.ipfw.edu

Aromatic Aster
Botanical Name: *Symphyotrichum oblongifolium*
Bloom Time: September-November
Pollinators: Bees
Water Use: Low
Light: Full Sun, Part Shade
Flower Color: Purple, Violet
Plant Type: Perennial
Region: Central and Eastern U.S.

Barnes, T. 2009. Aromatic Aster. Available at: http://upload.wikimedia.org

Wild Bergamot, Bee Balm
Botanical Name: *Monarda fistulosa*
Bloom Time: May-September
Pollinators: Bees, Bumblebees, Butterflies
Water Use: Moderate
Light: Full Sun, Part Shade
Flower Color: Purple, Pink, White
Plant Type: Perennial
Region: All of the U.S.

Otsego Conservation. 2008. Wild Bergamot. Available at: http://www.otsego.org

Compass Plant
Botanical Name: *Silphium laciniatum*
Bloom Time: July-September
Pollinators: Bees, Bumblebees
Water Use: Low
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Central and Eastern U.S.

Cressmoor Prairie Nature Preserve. 2011. Compass Plant. Available at: http://www.heinzetrust.org

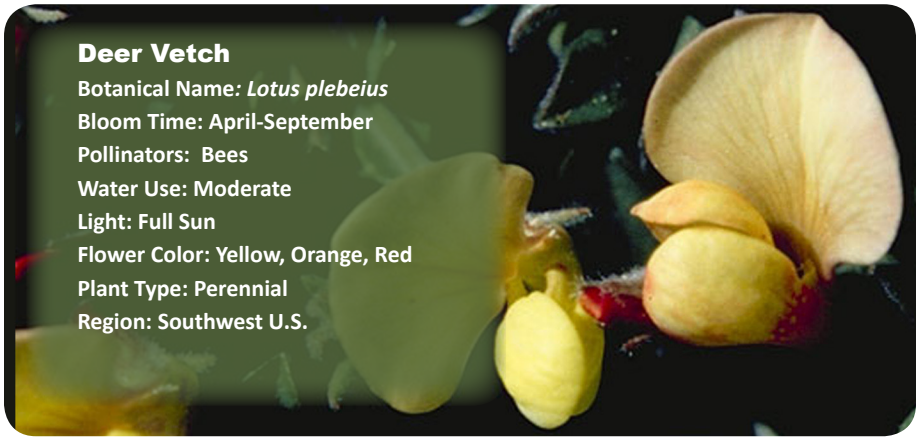
North Dakota Parks. 2011. Golden Alexander.Available at: http://www.parkrec.nd.gov

IPFW. 2008. Late Goldenrod. Available at: http://www.ipfw.edu

Hough, C. [Photographer]. 2007. Heath Aster (Symphyotrichum ericoides) http://commons.wikimedia.org

Cresmoore Heinz Land Trust. 2009. Prairie Gentian, New England Aster, CompassPlant. Available at: http://www.heinzetrust.org

Wilder Kaiser [Photographer]. 2008. Jerusalem Artichoke. http://commons.wikimedia.org



Flaigg, N. 1990. Lotus plebeius. http://www.wildflower.org/gallery/result.php?id_image=8765

Pitcher Sage
Botanical Name: *Salvia azurea*
Bloom Time: September-November
Pollinators: Bees, Bumblebees
Water Use: Low
Light: Part Shade
Flower Color: White, Blue, Purple
Plant Type: Perennial
Region: Central and Eastern U.S.

[Unknown Photographer]. 2012. Salvia azurea Blue sage. Available at: http://commons.wikimedia.org

Roundhead Lespedeza
Botanical Name: *Lespedeza capitata*
Bloom Time: July-September
Pollinators: Birds, Bees
Water Use: Low
Light: Full Sun
Flower Color: White
Plant Type: Perennial
Region: Central and Eastern U.S.

Transformational Gardening. 2010. Roundhead Bush Clover (Lespedeza capitata) http://www.transformationalgardening.com/forage/plants/lespedeza-capitata-images.html

Plains Sunflower
Botanical Name: *Helianthus petiolaris*
Bloom Time: June-September
Pollinators: Bees
Water Use: Low
Light: Full Sun
Flower Color: Yellow
Plant Type: Annual
Region: All of the U.S. except the South

Mongo [author]. 2007. Plains sunflower (Helianthus petiolaris). Available at: http://commons.wikimedia.org

Stiff Goldenrod
Botanical Name: *Oligoneuron rigidum*
Bloom Time: July-October
Pollinators: Butterflies, Bees, Honeybees
Water Use: Moderate
Light: Full Sun, Part Shade, Shade
Flower Color: Yellow
Plant Type: Perennial
Region: Eastern and Central U.S.

Trigg, R. 2009. Goldenrod. Available at: http://www.heinzetrust.org

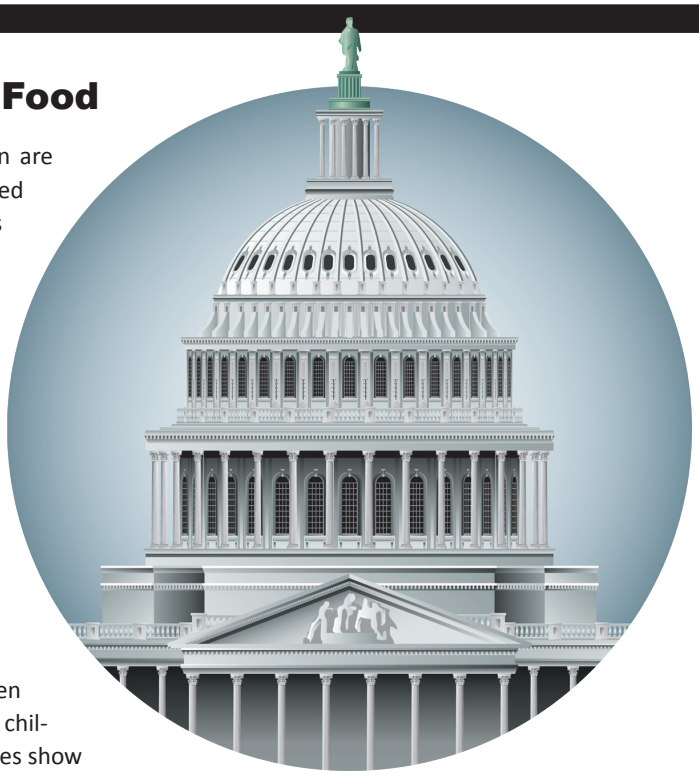
Prairie Sage
Botanical Name: *Artemisia ludoviciana*
Bloom Time: July-October
Pollinators: Native Bees
Water Use: Low
Light: Full Sun
Flower Color: White
Plant Type: Perennial
Region: All of the U.S.

Kojian, R. [Photographer]. 2011. Artemisia ludoviciana. Available at: www.gardenology.org

Sawtooth Sunflower
Botanical Name: *Helianthus grosseserratus*
Bloom Time: August-November
Pollinators: Butterflies, Bumblebees, Honeybees
Water Use: Moderate
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Central and Eastern U.S.

Mongo. [Photographer]. 2011. Sawtooth Sunflower. Available at: http://upload.wikimedia.org

Bill Would to Allow Toxic Fumigant on Food



Dow AgroSciences, one of the nation's largest pesticide makers, along with various food companies, have persuaded several members of Congress to endorse a bill that directs the Environmental Protection Agency (EPA) to reverse a proposed phase out of sulfuryl fluoride, a highly toxic food fumigant and potent greenhouse gas. If passed, the bill would make the U.S. one of only two western nations to allow sulfuryl fluoride on food, increase the number of American children ingesting unsafe levels of fluoride, and create a food poisoning risk for consumers who purchase food that contains permissible levels of the fumigant.

The *Pest Free Food Supply Act,* H.R. 1496, sponsored by Rep. Tom Graves (R-GA) and 14 others, seeks to prevent the proposed phase out of sulfuryl fluoride from taking effect. The phase out, which EPA proposed in January 2011, was prompted by a joint petition from the Fluoride Action Network (FAN), Environmental Working Group (EWG), and Beyond Pesticides. EPA based the proposed phase out on its finding that many children are currently being overexposed to fluoride, and that there is no safe room for additional fluoride exposures. Under the *Food Quality Protection Act* (FQPA), EPA cannot approve a pesticide if people are currently receiving too much of the pesticide chemical (in this case, fluoride) from other sources.

Fluoride is neurotoxic. Over 30 published studies have reported an association between fluoride and reduced IQ in children. Dow's own animal studies show that the brain is the main target for sulfuryl fluoride's effects, and fumigation workers who use sulfuryl fluoride have been found to suffer impaired cognitive function. Despite claims that sulfuryl fluoride produces a "tiny" increase in fluoride exposure, the maximum permissible levels in some fumigated foods are high enough to produce acute toxic reactions, such as nausea, vomiting, and headache. A child eating a single portion of pancakes made with flour fumigated at the maximum permissible level (125 ppm F) would ingest enough fluoride to be at risk for flu-like symptoms.

Nationwide GE Labeling Bill Introduced in Congress

U.S. Senator Barbara Boxer (D-CA) and U.S. Representative Peter Defazio (D-OR) introduced companion legislation in April that would require the U.S. Food and Drug Administration to "clearly label" all genetically engineered (GE) whole and processed foods, including fish and other seafood. The bill, the *Genetically Engineered Food Right-to-Know Act,* H.R. 1699 and S. 809, have 22 cosponsors in the House and 10 in the Senate. This national effort builds on the multiple ongoing campaigns to label GE foods at the state level.

"Americans have the right to know what is in the food they eat so they can make the best choices for their families," Senator Boxer said in a press release. "This legislation is supported by a broad coalition of consumer groups, businesses, farmers, fishermen and parents who all agree that consumers deserve more – not less – information about the food they buy."

Representative Jared Polis (D-CO), one of the bills co-sponsors, said of the labeling act, "Empowering consumers: consumers can choose to eat or not eat GMOs, or to pay more or less for GMOs." He said he believes consumers have a right to know what they are eating. I believe consumers have a right to know what they are eating so they can make their own informed food choices. I am proud to be working toward more informative food labels."

Before this national legislative effort, state labeling campaigns have been launched in California, Hawaii, New Mexico, Oregon, Maryland, Missouri, Vermont, and Washington. The precursor to these state efforts was the Proposition 37 campaign in California, which was a statewide ballot initiative voted on by Californians during the 2012 elections. Even though national polls indicated 91 percent of Americans supported GE labeling, a campaign ad launched by the agrichemical industry, which public interest groups cited as misleading, is credited with helping defeat the initiative by a 6.2 percent margin.

Pesticide Risks to Endangered Species Too Great Under EPA Review

A committee of the National Academy of Sciences' Research Council (NRC) in a new report outlines regulatory problems associated with pesticides that harm endangered and threatened species and suggests the need to overhaul EPA's deeply flawed pesticide approval process. The report, *Evaluating Risks That Pesticides Pose to Endangered, Threatened Species,* says that the agencies should use a risk assessment approach that addresses problem formulation, exposure analysis, effects analysis, and risk characterization when determining whether a pesticide is likely to pose a threat to endangered or threatened species. The committee examined several components of the risk assessment process that requires better coordination, leading to an integrated approach for examining hazards to listed species and their habitats. The findings imply that without a significant revamping of its review process, the operative agencies cannot meet their statutory obligations.

Under the *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA), before a pesticide can be sold, distributed, or used in the U.S., EPA is required to determine that the pesticide does not cause "unreasonable" adverse effects on the environment. However, in the case of species listed as endangered or threatened under the *U.S. Endangered Species Act* (ESA), all federal agencies, including EPA, are required to ensure that their actions will not jeopardize the continued existence of a listed species by diminishing the species' numbers and reproduction. To do this in its pesticide registration process, EPA is required to consult with the Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) when a federal action may adversely affect a listed species or its habitat.

Over the last decade, questions have been raised regarding the best approaches or methods for determining the risks that pesticides pose to listed species and their habitats. EPA, FWS, and NMFS have developed different approaches to evaluating environmental risks because their legal mandates, responsibilities, institutional cultures, and expertise vary. As a result, the National Research Council was asked to examine the scientific and technical issues related to determining risks posed to listed species by pesticides.

Federal Report on Honey Bee Health Downplays Pesticide Hazards

Despite the groundbreaking recent decision in Europe to protect honey bees by suspending highly toxic neonicotinoid pesticides, the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA) refuse to act on the overwhelming scientific evidence that these pesticides contribute to bee death and decline. A recent report issued jointly by the agencies presents no long-term, sustainable solutions to address the current bee crisis; instead, it recommends further research on the role of pesticides in honey bee health, highlighting the stymied pace of U.S. regulatory efforts.

The report summarizes comments made at the National Stakeholders Conference on Honey Bee Health held in October 2012, and highlights the uncertainties, rather than the bounty of evidence and on-the-ground beekeeper testimony. Parasites, disease, genetics, poor nutrition, and pesticide exposure were highlighted at the meeting as synergistic factors in the observable nationwide honey bee decline. The report recommends further research on the impacts of pesticides on bees at the colony level in the field, but does not capture the science connecting pesticides to adverse effects or the need for protective action. Though the report says that exposure of bees to a range of pesticides is common place, the level of exposure to any particular pesticide is generally not enough to immediately or acutely kill bees. However, acute testing for lethality does not include sublethal and chronic effects from prolonged exposure to multiple pesticides that occur in the field and cause demonstrable harm to bees, including immune suppression, navigational disruption, and decreased learning behavior.

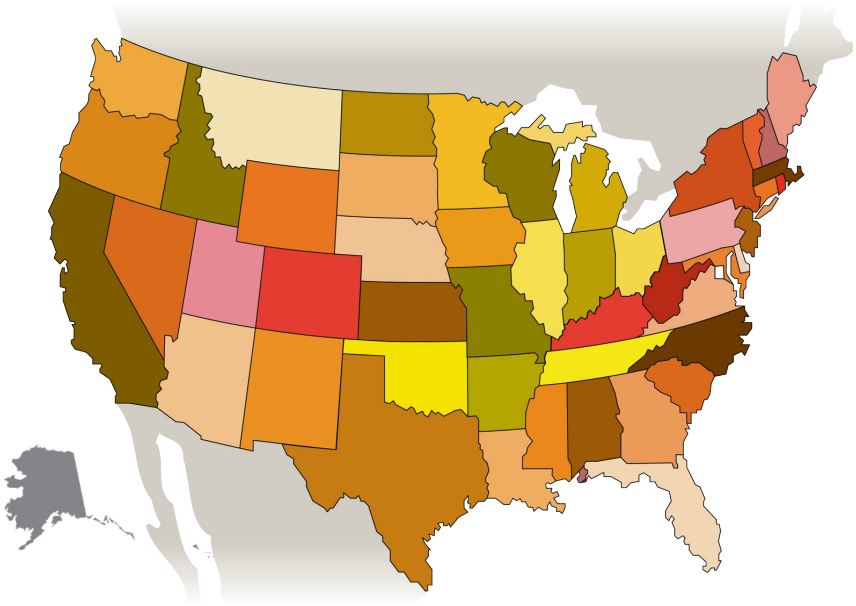
Unlike recent action in Europe, which placed a two-year ban on three neonicotinoid pesticides —imidacloprid, clothianidin, and thiamethoxam— due to their toxicity to bees, EPA has yet to implement immediate, strong, and protective measures for pollinator health. Instead, EPA is focusing on short-term risk mitigation measures, such as reducing contaminated field dust, which aligns with the pesticide industry's focus. The agency continues to dismiss scientific evidence of the acute and chronic toxicity of neonicotinoids and other pesticides on bees and other pollinators, and instead focuses on technological stopgap measures. Beekeepers and environmentalists have said that EPA has yet to uphold the "unreasonable adverse effect on the environment" standard, which is required under the *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA).

Increased Pesticides Found in CA Water

A report released by the Surface Water Ambient Monitoring Program (SWAMP) has found that pyrethroid pesticides in California sediment increased from 55 percent of statewide samples in 2008 to 85 percent in 2010. The findings are among the results of the Stream Pollution Treads, or SPoT, monitoring program, an annual assessment of pollution in streams in California. Beyond the 30 percent increase of pyrethroids detected in sediment, the percentage of highly toxic samples increased from 6 percent to 67 percent when toxicity tests were conducted at a colder temperature that more closely matched the normal surface water temperature in average watersheds. The report also found that stream beds in urban areas have higher levels of pyrethroids that those in agricultural areas.

According to the report, these results suggest that current monitoring may underestimate the occurrence of pyrethroid-associated toxicity using the standard protocol. The report also acknowledges that some pyrethroids, such as bifenthrin, may persist longer than others, and the chronic impacts of these pesticides may be underestimated by some of the sample results. Pyrethroids are synthesized derivatives of the natural-based pesticide pyrethrum, and are designed to be more toxic and longer lasting than pyrethrum.

This is not the first report to find that California has contaminated water. A 2011 report found increased levels of chemical pollution, including pesticides, in California water bodies. According to the report, which gathered monitoring data for 2008-2010, more than half of the state's water bodies do not meet existing water quality goals and many still need federal pollution control standards. While federal officials maintain that the increases are due to improved monitoring and not new pollution, the data presents a more accurate representation of real world contamination.



Chemical Impacts Intensified by Climate

With hotter and more frequent extreme weather events, scientists say harmful algal blooms caused by pesticides and fertilizer inputs will strike more often in water bodies like Lake Erie, to the detriment of aquatic life and surrounding wildlife. All trends show that the conditions that caused Lake Erie's 2011 algal blooms will continue recurring. The algal blooms, which cause bright green scum that completely covers the western part of Lake Erie, occur from mid-July to October.

"The 2011 bloom was a catastrophe. But it could become the new normal if we don't do anything," said ecologist Thomas Bridgeman, Ph.D. at the University of Toledo. Dr. Bridgeman contributed to these findings in April's Lake Eerie publication of the *Proceedings of the National Academy of Science,* entitled "Record-setting algal blooms in Lake Erie caused by meteorological trends consistent with expected future conditions."

The study finds that Lake Erie's algal problems are caused by agricultural practices, particularly fertilizer use, which provides nutrients for the blooms to grow. This in turn is compounded by warmer weather, which allows the cyanobacteria, or blue-green algae, to grow and multiply, causing toxic effects. Not only are these blooms toxic, they are also a sink for dissolved oxygen, causing so-called dead zones. Scientists say that the water chemistry of dead zones may also cause sediments that release yet more toxicants, such as mercury, that they store in cool, oxygenated waters. While at the same time, the dead zones may store phosphorous and other nutrients in the lake that are recirculated during storms.

The results of the study have implications not just for long-term management of Lake Erie itself, but also for farms alongside the lake that are a source of these algal-bloom causing nutrients. Ecologist and contributor Anna Michalak, Ph.D. at the Carnegie Institution for Science urges the adoption of prudent farming practices that could save farmers money while simultaneously reducing nutrient loads.

Report Questions Use of Nanomaterials in Food Chain

A new report, *Nanomaterials in Soil: Our Future Food Chain?*, finds that nanomaterials added to soil via fertilizers and treated biosolids used to fertilize fields could threaten soil health necessary to keep land productive. The report, by the Institute for Agriculture and Trade Policy (IATP), draws attention to the delicate soil food chain, including microbes and microfauna, that enable plant growth and produce new soil. Laboratory experiments have indicated that sub-molecular nanoparticles could damage beneficial soil microbes and the digestive systems of earthworms, essential engineers in maintaining soil health.

"In light of published research, the Obama administration should institute an immediate moratorium on fertilizing with biosolids from sewage treatment plants near nanomaterial fabrication facilities. A moratorium would give researchers time to determine whether nanomaterials in soil can be made safe and to research alternatives to building soil heath, rather than depending on fertilization with biosolids," says IATP senior policy analyst Steve Suppan, Ph.D., author of the report.

The report also details the risks of applying dried biosolids that incorporate nanomaterials, including inflammation of the lungs, fibrosis and other toxicological impacts. Biosolids, otherwise known as sewage sludge, are composed of dried microbes previously used to process wastewater in treatment plants. The material is increasingly being used in conventional agriculture, but its application is explicitly forbidden in organic production. This is because the sludge can contain high concentrations of toxic contaminants, such as pesticides, detergents, estrogenic hormones, antibiotics, dioxins, PCBs, flame retardants, and heavy metals.

Good organic practices work to build the soil and maintain an ecological balance, rendering chemical fertilizers and synthetic pesticides unnecessary.

With no regulatory system in place —in the U.S. or elsewhere— for producing, and selling nano-fertilizers, IATP's report concludes by asking for governments to require robust technology assessments involving biological engineers, soil scientists, public health professionals, farmers and concerned citizens before allowing indiscriminate application by industry.

Study Reveals Multi-Generational Impacts of Pesticide Exposure

Using the aquatic species *Daphnia*, commonly referred to as "water fleas," scientists at North Carolina State University (NC State) determined that exposure to the pesticide pyriproxyfen affected multiple generations, ultimately resulting in more male offspring, and causing reproductive problems in female offspring. Lead author Gerald LeBlanc, Ph.D. notes, "This work supports the hypothesis that exposure to some environmental chemicals during sensitive periods of development can cause significant health problems for those organisms later in life —and affect their offspring and, possibly, their offspring's offspring." The study, published in the journal *PLoS One*, provides the scientific community with new information on how organisms respond to the environmental signals resulting from pesticide exposure.

Environmental cues normally determine whether the *Daphnia* offspring will be male or female, according to the researchers. This study is part of an investigation to understand the mechanisms involved with these environmental cues. The NC State team had previously identified the hormone methyl farnesoate (Mf) as an important factor in determining the sex of the organisms at the embryotic stage. The scientists exposed *Daphnia* to varying levels of the pesticide pyriproxyfen, an insecticide that mimics the Mf hormone. The exposure resulted in *Daphnia* producing more male offspring, and less offspring in general. Higher doses exacerbated the effects. "At high concentrations, we were getting only male offspring, which is not good. Producing fewer offspring, specifically fewer female offspring, could significantly limit population numbers for *Daphnia*," Dr. LeBlanc says.

Even low dose exposures, as low as 71 parts per trillion, had significant impacts on the reproductive capabilities of the organisms. At this concentration *Daphnia* still produced some female offspring, but those females experienced long-term reproductive effects, and produced significantly lower numbers of offspring even though they had not been exposed to the insecticide since birth. "We now want to know specifically which genes are involved in this sex determination process," Dr. LeBlanc says. "And, ecologically, it would be important to know the impact of changes in population dynamics for this species. *Daphnia* are a keystone species —an important food source for juvenile fish and other organisms."

Have an Organic Garden? ...let us know!

Pesticides are hazardous to health and the environment, and are toxic to bees and other beneficial insects. They are also unnecessary to have a beautiful yard and landscape. You can adapt an organic soil fertility program, eliminate pesticides and create a pollinator friendly landscape.

Pledge your yard, park, garden, or other community or business-managed green space as organically managed and pollinator-friendly. Indicate how many acres (or what fraction of an acre) you can declare as organic and how many acres of pollinator habitat you create!

Go to **http://bit.ly/LawnDeclaration** to read the pledge and sign the declaration.

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