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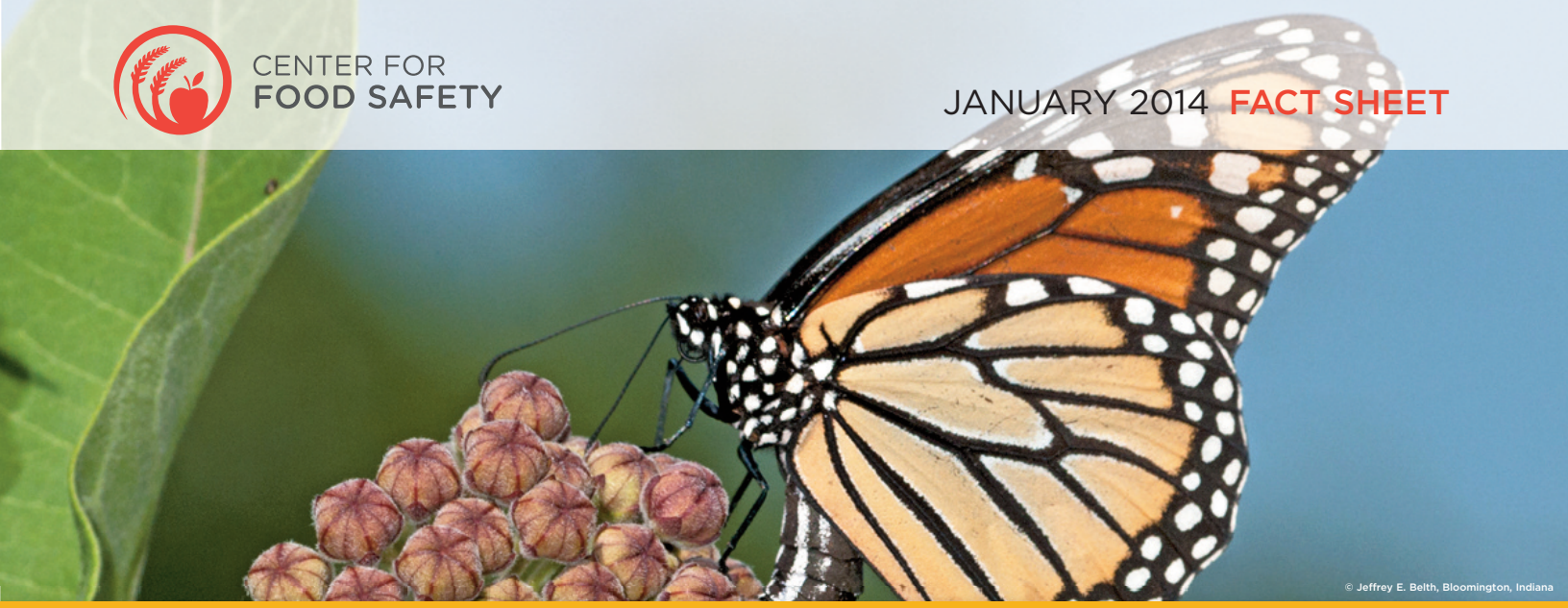
JANUARY 2014 **FACT SHEET**



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MONARCH BUTTERFLIES AND PESTICIDE PROMOTING CROPS

MONARCHS ARE THE MOST popular butterfly in North America and are celebrated for their remarkable migration, traveling 1,200 to 2,800 miles or more between breeding areas in the United States and Canada to overwintering sites in central Mexico and California. Every year between October and February, thousands of people flock to overwintering sites along the California coast and in Mexico's mountaintop sanctuaries to see these beautiful butterflies clustered together in the trees.

Like managed honey bees and native bees, moths and butterflies are also important pollinators. The U.S. Fish and Wildlife Service lists nearly 40 pollinator species as threatened or endangered, and several more are currently being considered.[i] And like these other pollinators, Monarchs are suffering. In fact, the Monarch butterfly population in North America has been shrinking at an alarming rate. In 2012, Monarchs were at their lowest levels since record-keeping began and nearly 20 times smaller than at their peak in 1997, just 15 years before.[ii] All indications are that Monarch numbers were much lower still in 2013.[iii] One cause of this drastic population decline is that Monarch breeding habitat is being destroyed by herbicides used on genetically engineered (GE) crops.

BIG AG LEAVES NO ROOM FOR MONARCHS

The critical food source for larvae of Monarch butterflies in their main breeding grounds in the Midwest, common milkweed, is quickly being decimated by the rampant use of glyphosate, the herbicide used in conjunction with Monsanto's Roundup Ready GE crops (glyphosate is the active ingredient in Roundup herbicide).[iv] Milkweed species are critical to the Monarch's survival because they are the *only* kinds of plants Monarch larvae eat.

Throughout the life cycles of North American Monarchs, milkweed plays a critical role in their health and survival.[v] During the spring and summer seasons, successive generations of Monarchs lay their eggs on different kinds of milkweed plants across the U.S. and southern Canada. Their larvae feed and grow on these milkweed plants, go through metamorphosis, and emerge as adult butterflies that repeat the cycle until conditions change in the fall. Besides providing nourishment to larvae, toxins in the milkweed plants are transferred from larvae into adults, and protect adult butterflies from many predators. In the autumn, the last generation of butterflies migrates to Mexico to wait out the winter. The overwintering sites in mountain forests provide Monarchs with a refuge from harsh climate conditions, allowing them to survive. Then, during the following spring, they return north in search of emerging milkweeds to start the cycle again.

Now, however, these extraordinary insects are suffering at the expense of industrial agriculture. It's no secret that pesticides (including herbicides) cause considerable collateral damage, harming thousands of non-pest plant and animal species around the world—after all, they are designed to be toxic. Sadly, Monarch habitat is being decimated by increasing glyphosate use on massive fields of corn and soy. Agricultural glyphosate use has risen exponentially, from 25-30 million pounds in 1995,[vi] to 180-185 million lbs. in 2007,[vii] a six-to-seven-fold increase. Not surprisingly, glyphosate has become the most widely used herbicide in the world.

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KING CORN TRUMPS THE MONARCH'S KINGDOM

Almost all of the corn, soy, and cotton varieties grown in the U.S. are now genetically engineered to withstand the milkweed-eradicating herbicide, glyphosate, also known as Roundup Ready crops.[viii] In 2013, Roundup Ready crop varieties comprised 93% of soybean acres and 85% of corn acres,[ix] making them nearly ubiquitous across the Midwest Monarch habitat. Researchers estimate that the number of milkweeds in Iowa corn and soybean fields has decreased by 98.7% between 1999 and 2012.[x] Because farmland dominates the Midwest, there's not nearly enough non-agricultural milkweed habitat to support Monarchs. And even these marginal areas are shrinking. For instance, a recent study published in the *Proceedings of the National Academy of Sciences* estimates that 1.3 million acres of grassland and prairie were converted to corn and soybeans in the western Corn Belt between 2006 and 2011,[xi] meaning still fewer milkweeds. Perverse governmental incentives to grow more corn for ethanol production are the major driver of these land conversions.

When applied to Roundup Ready crops, glyphosate is sprayed over the top of plants during the growing season, and is one of the few herbicides that is very good at killing milkweed.[xii] It is absorbed by the leaves and stems and then moves down to the shoot buds on the roots, killing them as they develop and thus stopping the further growth and spread of the plant. It is not uncommon for glyphosate to be sprayed twice per season, a practice that is rapidly increasing as farmers try to combat weeds that have developed herbicide resistance in their fields.[xiii] And because Roundup Ready crops are increasingly grown every year, milkweed has no chance to recover. As noted above, it has taken barely more than a decade for glyphosate to nearly eliminate milkweed in Iowa corn and soybean fields, and similar trends have been noted in other Midwestern states. Additional Roundup Ready crops are also being adopted, such as alfalfa and sugar beets, further encroaching on Monarch habitat.

TURNING A NEW LEAF TO MAKE ROOM FOR MONARCH FLOWERS

The only way to save milkweed, the Monarch's key host plant, is to turn away from the unsustainable, herbicide-intensive approach fueled by GE herbicide-resistant crops. The goal of weed eradication must be replaced by weed management. Agronomists and growers must acknowledge that low level weed presence does not necessarily reduce crop yields, and that herbicide use practices must account for the seriously adverse effects of wiping fields clean of all life but the crop.

There are many cultural methods for keeping weeds in check—crop rotation and cover crops, to name a few. Organic farmers have proven that such methods can provide adequate weed suppression and profitable production of crops. Other research shows that conventional farmers can reduce herbicide use by more than 80%.[xiv]

Adopting these alternative weed management practices will help both nature and farmers; it will enhance biodiversity in agricultural areas and simultaneously create a more resilient and productive agricultural system for farmers to grow their crops. Milkweeds and agriculture need to coexist for Monarchs to thrive, and increased use of non-chemical weed management practices would allow enough milkweed to grow within and around fields to preserve this iconic butterfly species.

WHAT YOU CAN DO

- Sign our petition to curb the proliferation of herbicide promoting GE crops:http://bit.ly/monsantovsmonarchs
- Buy organic foods that don't allow the use of glyphosate or other synthetic herbicides for production
- Plant milkweeds for Monarch larvae and other nectar-rich plants for adult butterflies in your backyard! Visit our website for a list of pollinator-friendly flowers to grow in different seasons.
- Encourage your city, local businesses and schools to create Monarch habitats

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[v] For summaries of Monarch biology, see: Commission for Environmental Cooperation. (2008). "North American monarch conservation plan." Montréal: Communications Dept. of the CEC Secretariat. Available at: http://purl.access.gpo.gov/GPO/LPS96018.; Oberhauser, KS & MJ Solensky, eds. (2004). *Monarch butterfly biology & conservation*, Ithaca: Cornell University Press.; Malcolm, SB & MP Zalucki, eds. (1993). *Biology and Conservation of the Monarch Butterfly*, Los Angeles: Natural History Museum of Los Angeles County.

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[ix] Ibid.

[x] Pleasants, JM. (in press). "Monarch Butterflies and Agriculture," Ch. 14 in: *Monarchs in a Changing World: Biology and Conservation of an Iconic Insect*, Ithaca: Cornell University Press.

[xi] Wright, CK & MC Wimberly. (2013). Recent land use change in the Western Corn Belt threatens grasslands and wetlands. *Proceedings of the National Academy of Sciences*, 110(10): 4134-4139.

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