Is It Safe? Confusion Surrounds GMOs
Donna Aufdenberg, MU Extension Horticulture Specialist

Go to the grocery store and in any aisle you are bombarded with choices. Do you buy organic? Gluten free? Reduced fat or fat free? Fortified or natural? Hormone free? High-fructose corn syrup, artificial sweetener or sugar? Now we find “Partially Produced with Genetic Engineering” on many boxes and bags throughout the grocery store. The statement can be found below or around the nutritional information on the packaging.

Here locally, people freely share their concerns with me about genetically engineered foods (GE foods). Concerns range from how they affect the human body (including long term affects) to the environmental effects to corporate control of foods to fear of the unknown. One interesting fact is that in the nearly 20 years that GE products have been grown and sold, there hasn’t been one instance of verified harm to a human. (Some people’s bodies may be more sensitive to GE foods and have adverse reactions, so avoidance may be very important.)

Since the beginning of domesticated agriculture, most if not all food crops have been modified by man to improve taste, yield, disease resistance and other traits. In the past, these genetics were modified through cross breeding or selective breeding or similar methods. This process takes many years. A GMO is typically defined as a plant or animal that has had its DNA (genes) altered in a lab through genetic engineering to enhance desirable traits. Unlike cross-breeding, which takes longer and other undesirable traits may come along, genetic engineering allows for more precise gene transfer of only the desired gene(s).

Benefits of GMOs include helping increase food for a growing population, enhance food quality, increase yield by decreasing damage

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from weeds, diseases, insects and drought. Examples include “Bt” corn, “Vitamin A Enhanced” rice or “reduced-bruising” potatoes.

Contrary to belief, many of the GMO seeds are not readily available to home gardeners. For example, the GMO sweet corn is hard to get and very expensive. It must be special ordered through catalogs or through seed dealers. One can be rest assured, if seed packets are purchased at local stores and garden centers, the likelihood of being a GMO is very minute, almost nil. To ensure that the seed you purchase is truly non-GMO, purchase USDA Certified Organic seed.

We have now seen the beginning of GE food labelling. Many vocal consumer groups feel that they have the right to know what is in their foods, including GMOs. Labeling at this point is not a US federal regulatory requirement, but rather voluntary. Many food companies are already including “Partially Produced with Genetic Engineering” on their labels. On the other hand, if a label says “GMO free” or similar statement, be careful and research the product. Some of these products actually contain small amounts of GMO products. To be certain a food does not contain GMOs, seek out and purchase USDA Certified Organic foods which are not allowed to have GE ingredients or seek out food list from third party auditors, such as the Non-GMO project.

**GE foods are very controversial and misunderstood. Much research is being marketed as fear tactics. Don’t fall victim to the fear. Take a closer look at the research and do your own homework before making a decision that is right for you on GE foods. Knowledge is empowering!** Regardless of what side you reside on the matter, feeding the world is a growing problem that we will need to work on together sooner than later. Regardless how you choose to buy or even grow your own food, try to keep an open mind. For more information, check out MU Guide N1309, “Is it safe? Information on genetically engineered foods for consumers” [http://extension.missouri.edu/explorepdf/hesguide/foodnut/n01309.pdf](http://extension.missouri.edu/explorepdf/hesguide/foodnut/n01309.pdf)

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### What food currently is in the US food supply?

<table>
<thead>
<tr>
<th>Plant</th>
<th>Genetic Trait expressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn (field and sweet corn)</td>
<td>Insect resistance, herbicide tolerance, drought tolerance</td>
</tr>
<tr>
<td>Soybeans</td>
<td>Insect resistance and herbicide tolerance</td>
</tr>
<tr>
<td>Cotton</td>
<td>Insect resistance and herbicide tolerance</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>Herbicide tolerance</td>
</tr>
<tr>
<td>Sugar Beets</td>
<td>Herbicide tolerance</td>
</tr>
<tr>
<td>Summer Squash</td>
<td>Disease resistance</td>
</tr>
<tr>
<td>Potatoes -few varieties</td>
<td>Reduced bruising and black spot, non-browning</td>
</tr>
</tbody>
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To help avoid GE/GMO foods, you might consider:

- Purchase USDA Certified Organic products. Look for the seal on the front of products.
- Avoid boxed or bagged items. Avoid the center aisles of the store where these items are found. These are usually highly processed foods.
- Avoid food listing high-fructose corn syrup, whey, xanthan gum, lactic acid, cellulose, citric acid, artificial sweeteners, maltodextrin and mono and diglycerides as ingredients. As a general rule, these are GE products.
- Assume all “non-organic” corn, soy, cottonseed and canola ingredients are GE foods.
- Shop the perimeter of the store. Stick to the vegetables, fruits, meat and whole grains.
- Avoid all non-diet sodas. Sodas ARE a Genetically Engineered food product!
Outdoor Flowering Plants and Ornamentals
- Gently brush off heavy snows from tree and shrub branches.
- After ice events and once the ice melts, inspect plants for broken branches. Prune out damages.
- Check to see if any perennials have been heaved by freezing and thawing of soil. Firmly press down any that have lifted and mulch.
- Plant pansy seeds indoors now for spring bloom.
- Work on your landscape ideas now! Make an inventory of the plants around your home landscape. Note their location and past performance. Plan changes on paper first.
- Make sure to wrap trunks on young trees with light colored cloth or wrapping to prevent trunk damage by the sun’s rays.

Indoor Plants
- Wash dusty plant leaves on a regular basis. This allows the leaves to better gather light resulting in better growth and health.
- Start new cuttings from overgrown houseplants.
- If plants seem to dry out too fast, make sure they are sitting away from areas near heat vents or drafty areas.
- Keep holiday poinsettias and holiday cactus near a bright window. Water as the top of the soil becomes dry.
- Allow tap water to warm to room temperature before using on houseplants.

Vegetable Gardening
- Review your vegetable garden from last year. Jot down any changes that need to be made for this years garden. Bigger or smaller? More produce or less? What varieties? Does timing for seeding and transplanting need to change?
- Collect seed catalogs and find a cozy spot to sit and start dreaming!
- Before ordering new seed, do germination tests to see if seeds are still viable.
- Try sowing lettuce in trays or salad boxes for a winter treat.

Fruits and Nuts
- It is time to start thinking FRUIT TREE MAINTENANCE. Plan to prune, plan to spray and make a schedule of what needs to be done and when!
- When spraying fruit trees, make sure that you spray the whole tree and not just the parts that you can reach.

Miscellaneous
- For winter blues, forcing bulbs can add a little color to your windowsill. Paper whites, tulips and hyacinth are cherry flowers to try. Make sure they are pre-chilled or they won’t bloom.
- Cut branches of forsythia, pussy willow, crabapple, quince, honeysuckle, and other early spring-flowering plants to force into bloom indoors.
- This is also a good time for cleaning, sharpening, and repairing tools and equipment. Make sure to give your tools a good oiling before putting away.

Garden Comfort and Convenience
Here is a list of garden supplies that makes gardening more comfortable!

- A good pair of gloves
- A cheap pair of gloves you don’t mind if they get ruined for messy duties!
- A good hat with sun protection
- Tools with good handle grips. Foam pipe insulation or neatly applied electrical tape also works well.
- Kneepads or kneelers. (kneepads allow for greater movement and kneeler must be picked up a moved every few minutes)
- An old plastic laundry basket or 5-gallon bucket for weeding
- Timers for water hoses
- Good quality shut-off valve for hose
- Washable gardening shoes or clogs
- Good quality pruners and hedge shears
Are you looking for reading material to carry you through until spring arrives. Here are some ideas for the winter reading lists recommended by fellow gardeners….


- *Botany for Gardeners* by Brian Capon is a comprehensive guide on plants - from plant taxonomy to understandable illustrations.

- *Building Soil: A Down-to-Earth Approach: Natural Solutions for Better Gardens and Yards* by Elizabeth Murphy is a guide on how to improve the soil.

- *Growing Vegetables With A Smile* by Nikolay Kurdyumov

- *Native Landscaping for Wildlife and People* by Dave Tylka

- *Natural Solutions for Better Gardens and Yards* by Elizabeth Murphy


- *The Plight of the Pollinator* by Bill White, 2016 Missouri Department of Conservation free publication. A great guide on pollinator plants and pollinator species. Available online at [https://mdc.mo.gov/conmag/2016/02/plight-pollinator](https://mdc.mo.gov/conmag/2016/02/plight-pollinator) or from a local MDC office.

- *Homegrown Milkweeds* by Norman Murray, 2016 Missouri Department of Conservation free publication. A guide on the different milkweeds for Missouri and how to start the seeds. Available online at [https://mdc.mo.gov/conmag/2016/01/homegrown-milkweeds](https://mdc.mo.gov/conmag/2016/01/homegrown-milkweeds) or from a local MDC office.

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**Last Call…Master Gardener Hours!**

If you have already completed volunteer hours for the year, please get them reported online or send to your local Master Gardener Coordinator.

- If you need a new copy of hour the record sheet, you can find it at [http://mg.missouri.edu/mgforms.htm](http://mg.missouri.edu/mgforms.htm) or contact your local coordinator and they will send you one.

- **We are really encouraging the online reporting system this year. Check out:** [http://report.missourimastergardener.com/](http://report.missourimastergardener.com/)

- If any of your information has changed (address, phone, or email), please let us know.

These hours are important to us! They help ensure the continuance of the program. Coordinators contact information is on the back of this newsletter.
As I was preparing to attend my Master Gardener Program, I purchased Alice Bowe’s book, *High-Impact, Low-Carbon Gardening: 1001 Ways to Garden Sustainably*, to gain a better understanding how to improve my gardening practices. I have been striving for years to be more engaged and responsible about the footprint I leave on the environment. I recycle religiously. I try to repurpose things in my life I no longer need or find useful. Despite that effort, I never truly understood or appreciated how important sustainable gardening is to the “big picture”.

Prior to my retirement, I worked for a large corporation for over 30 years that raised stringent sustainability practices to a core business value. This company was at the international forefront of environmental awareness and action. I lived and breathed sustainability every day at work yet I did not know where to start in my garden. It was overwhelming! Thanks to Alice Bowe, I now feel I am headed in the right direction.

*High-Impact, Low-Carbon Gardening: 1001 Ways to Garden Sustainably* is presented in 13 easy to absorb chapters. The author covers topics such as why you should focus on improving your garden’s ecological credentials and the basic principles of sustainable planting design. Chapters also address preparing soil for planting, choosing appropriate plants to withstand drought and other challenging conditions and gardening with wildlife in mind. Some of the advanced topics covered are permaculture, hydroponics and aquaponics. After reading this book, I plan to do more research on rain gardens. This may well be a solution for areas in my back yard which regularly wash away after heavy rains.

Alice Bowe has written a great resource book that fits well in any gardener’s library. The excellent photography in the book will also help inspire gardeners during the long winter hiatus. That just might be good for the environment too!

**Herb - Stevia**

Sarah Denkler, MU Extension Horticulture Specialist

*Stevia rebaudiana* (Bertoni) also known at sweetleaf or sugarleaf is an annual in zone 5 and 6. It grows in full sun to 2-3 feet tall and wide. Prefers well drained soil. Leaves are sweet, containing a glycoside that has a sugary taste.

The leaves can be used fresh (before flowers form) but are sweeter when dried and crushed. Small leaves are best. Individual leaves can be dried or the plant can be dried by cutting, bundling, and hanging upside down to dry in a warm location. Once dried, the leaves will need crushed to release the sweetness. Smaller leaves are sweeter and lack the bitterness of larger leaves. A pinch of crushed stevia powder equals 1 teaspoon sugar (1/4 tsp equals 1 tablespoon sugar and 2 to 3 tsp equals 1 cup of sugar)

Could be grown for farmers market, for herb market or for use in teas.

Thrips, whiteflies or aphids could be an issue.
I enjoy reading garden calendars because they are helpful reminders of what I need to be doing throughout the year. The January list of tasks from 1001 Garden Questions Answered by Alfred Carl Hottes of Ohio State University, printed in 1926 includes things to do in the library or living room, home orchard, small greenhouse, and garden and still apply 90 years later.

In the library or living room:

- Read the best books about the practical doings in a garden, also read some books about the appreciation of a garden.
- Read, mark, and inwardly digest the catalogs. They are written for you and published at great cost. Treat them as literature and preserve them for future reference.
- Plan your garden for the year. Marshal all your thoughts of what you desire in your garden. Get estimates on the cost of construction of such features as pools, seats, arbors, fences. Try to afford one such accessory.
- Plan the crops you will plant to succeed each other in the vegetable garden.

In the home orchard:

- Prune the trees and spray as directed.
- Protect trees from mice and rabbits.
- Do not prune peaches or raspberries as early as January, because they may be injured by freezes later.
- Prune out cankers from apples and pears, and black knot in plum.

In the small greenhouse:

- Plants will need careful watering. The lack of sunshine will cause them to dry but slowly.
- Various hardy perennials, such as campanulas and delphiniums may be brought into the greenhouse and forced for early spring blooming.
- Seeds of pansies, English daisies, forget-me-nots, *vinca rosea*, and snapdragons may be sown for bedding.
- Start taking cuttings of geraniums, coleus, and other bedding plants.
- Repot all greenhouse plants as they start growth.
- Check and spray for spider mites, they like hot, dry places.
- Start to force bulbs that are rooted sufficiently.

In the garden:

- Haul manure and spread it over soil that is to be spaded or plowed.
- Prune shrubs of dead branches, or when too thick or too tall. Remember that flowering wood should be preserved. (meaning the spring flowering shrubs should be pruned after flowering in the spring)
- Prune hydrangeas, hibiscus.
- Shake the snow form shrub or evergreen branches which are bent to the ground.
- Large trees, both evergreens and deciduous, may be transplanted by digging a large ball and allowing it to freeze. Do the digging work when the weather is mild and transplant when the ball is frozen.
- Make cuttings of shrubs.
- Build a birdhouse.
Upcoming Events

The following Master Gardener meetings are held each month. All are welcome to attend. Please contact your local extension office to confirm location if you did not attend the previous meeting.

Parkland MGs - 1st Monday at 6:30pm, Farmington Public Library
Poplar Bluff MGs - 1st Tuesday at 6:00pm at First Episcopal Church in Poplar Bluff, MO (Do not meet in January)
Ste. Genevieve MGs - 2nd Thursday, at 6:30pm, Ste. Gen. County Extension Center
Cape Girardeau MGs - 3rd Thursday at 7:00pm, Cape County Extension Center in Fall and Winter and Shawnee Park Center in Spring and Summer. Call 573-238-2420 for questions
Perry MGs - 4th Monday at 6:30pm, Perry County Extension Center

JANUARY 2017
12-14 - Great Plains Growers Conference, St. Joseph, MO; For more information, see http://www.greatplainsgrowersconference.org/
18 - Scaling up Production with Specialty Crop Block Grant Writing Workshop at the Farmington Public Library from 6 to 9 pm. Fee: $20; To register, call 573-883-3548;
21 - Parkland Beekeepers Association Workshop, Mineral Area College. For more information, call 573-631-8236
23 - Grow Your Farm, 10 sessions starting Jan. 23, Hillsboro, Cost $130, Contact Debi Kelly at 636-797-5391 for more information.
31 - Berry Production, Ste. Genevieve Public Library, 6:30-7:30 p.m. FREE!

FEBRUARY
4 - Perry County Master Gardener Spring Symposium, Perryville Higher Education Center
4 - High Tunnel/Winter Production Workshop, Hillsboro City Hall, 101 Main Street, Hillsboro, MO. RSVP to Miranda Duschack, duschackm@lincolnu.edu or 314-604-3403.
6 - Totally Tomatoes, Cross Roads Fellowship Church in Potosi at 6:30 pm. Fee: $15. For more info, call 573-438-2671
9 - Native Plant School: Greenhouse Propagation of Native Plants. Shaw Nature Reserve Greenhouse area from 1:00 - 4:00 p.m. Cost: $17. For more information, see www.missouribotanicalgarden.org/

MARCH
4 - Parkland Master Gardener Spring Symposium, Mineral Area college in Farmington
11 - Cape Girardeau Master Gardener Spring Seminar, Cape

Comfort Food Recipe - Pistou Soup
Donna Aufdenberg, MU Extension Horticulture Specialist

Recipe: Pistou Soup
From the Kitchen of: Don and Carol Koehler
4 shallots, finely chopped
3 large cloves garlic, crushed
3 tbl vegetable oil
2 cans tomato soup
2 cups water
2 tsp. butter
1 1/2 cups pasta
2 Tbl. dried basil
1/2 cup cheese croutons
fresh parsley
1 1/2 cup cooked green beans


My Notes: ____________________________
When we get a cold winter, people tend to think that the insects won’t be as bad as the following growing season. This is a myth! Insects are very good at surviving to torture us and our plants. Our native, resident insects are well adapted to our climate and know how to survive our winters. This is bad news when you think about all the time you spend picking them off, spraying, or putting up with the damage they cause. The good news is that only two percent of insect species are actually pests; many are beneficial or cause no harm. Beside, without challenges, gardening and life would be boring!

Insects go through a phase call diapause to survive the winter. It is an inactive state of arrested development. When the day length gets shorter, it triggers this stage. The insect’s metabolic rate drops to one tenth or less to slowly use stored body fat to survive the winter. Many insects also produce alcohols that act as an antifreeze. Their bodies can reach temperatures below freezing without forming ice that damages the cells. Warm temperatures usually trigger the end of the diapause phase. Since it would be deadly for the insect to come out of diapause too early, most insects do not come out until a long period of cold comes before the warm weather.

Many insects overwinter as eggs. Aphid eggs can be found in the bud scales of woody plants. Bagworm eggs are found in the bags left on the tree. Tent caterpillars spend the winter as egg masses on branches. Some adult insects can seek shelter in protected areas (under loose tree bark, fallen leaves or bark, and firewood). Native lady beetles overwinter in herds in sheltered areas outside while Asian multicolored lady beetles look for a warm spot in our homes as does the brown marmorated stink bug. Still other insects overwinter in the larval or immature stage. Turf feed grubs overwinter deep in the soil as beetle larvae. Some moths and swallowtail butterflies overwinter as pupae in cocoons or chrysalis.

Insects are very adaptive but winter conditions can affect their survival. Cold temperatures, fluctuating temperatures, length of cold spells, how protected the overwintering locations is, and snow cover all affect an insect’s survival rate. So while some insects will not survive the winter, there are always ones that will survive to thrive in our gardens and landscapes in the new year. For more information, check out this article from University of Minnesota Extension, where it gets much colder! http://www.extension.umn.edu/garden/insects/find/insect-strategies-to-survive-winter/