

Best Management Practices

Row Crop Production

Initiative supported by:



The Missourians for Monarchs Habitat Initiative is a partnership between producers, federal, state and local conservation organizations to sustain habitat for monarch butterflies and pollinators through voluntary citizen involvement. The collaborative agrees to create at least an additional 19,000 acres of pollinator habitat annually for the next 20 years.

Learn how you can benefit monarch butterflies & pollinators not only on agricultural land, but also at home, school & other sites: moformonarchs.org

Photo courtesy of: MDC



Following these BMP's can help improve your property for monarchs, pollinators and other grassland dependent wildlife like quail and grassland songbirds while improving water quality and holding soil in place. If you would like to discuss your plans with a resource professional, please contact your local Private Lands Services biologist with the

Missouri Department of Conservation:

<https://mdc.mo.gov/regional-contacts?county=103&=Go>

Your local county **Natural Resources Conservation Service Field Office:**

<https://www.nrcs.usda.gov/wps/portal/nrcs/site/mo/home/>

Your local **U.S. Fish and Wildlife Service Missouri Private Lands Office:**

<https://www.fws.gov/midwest/partners/index.html>;

Your local **Soil and Water Conservation District Office:** <https://mosoilandwater.land/> for assistance from a resource professional.



Photo courtesy of: Mark Ramsey

5. Consider cover crops

- Diverse mixes are best for pollinators and can provide excellent nectaring opportunities.
- Cover crops can reduce erosion and costs of fertilizer, herbicides and insecticides while increasing soil health and supporting beneficial insect populations.
- Cover crops such as buckwheat, sunflower, canola, clovers and others suppress weeds while enhancing pollinator habitat when allowed to bloom.
- Consider balancing timing of termination of cover crops to allow for species to bloom when practical. Terminating cover crops past peak bloom would be ideal for pollinators. Another option is to terminate winter cover crops through the use of grazing as this will allow maximize habitat and build soil organic matter.
- Terminate crops with as little physical disturbance as possible to benefit pollinators.
- Flowering broadleaf species are preferred to assist pollinators.
- You can download more considerations and a list of best cover crops for pollinators at the following website: https://efotg.sc.egov.usda.gov/references/public/MO/2_APPENDIXI_CoverCrop340_Jan2016.xlsx

6. Be aware of local Beekeeper Hives and keep them informed of your planned management activities

- Utilize the Driftwatch website to locate bee hives that may be near your location.
 - <https://mo.driftwatch.org/map>
- Communicate planting activities to neighboring beekeepers when practical, and be aware of beehives adjacent to the planting area.
 - Check with beekeepers for locations of local hives, Repeat this process annually as beekeepers may change locations of hives.
 - Keep local beekeepers contact details in the cab and on your mobile phone.
 - Give at least 24 hours' notice of spraying and provide the name and active ingredient of product being used.
- Appreciate that beekeepers are facing a tough challenge to keep their honey bee colonies alive and productive.
- Participate in research related to improving and protecting bee health.
- Always follow the label directions and avoid spraying any plants where bees may be foraging or areas that could be attractive to bees.
- Consider adding bee nesting sites in odd areas. Creating bare ground and leaving chunks of wood, dead trees and brush in odd areas can help!

93% of Missouri is held in private ownership and most of those acres are owned and operated by farmers and ranchers that depend on the land they own to make a living. Landowners inherently want to leave their farms in better shape than they found them and are willing to help promote multiple land uses when they are sustainable and do not cause economic losses that would endanger their operation. The Missourians for Monarchs Collaborative understands this important issue and the following is a list of Best Management Practices (BMP's) that can help integrate pollinator habitat into a successful farming operation. Missourians for Monarchs also realizes that not all these BMP's will work for every operation, but it is our intent to offer multiple practices to help farmers and ranchers reach their management objectives for pollinators with minimal effect on farm profitability.



Photo courtesy of: MDC

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1. **Use Integrated pest management** best management practices when working around pollinator plots.
 2. Do not use any insecticides in or surrounding pollinator habitat, but if you must use pesticides limit their use to only control invasive or noxious weeds.
- Follow labels on pesticides.
 - If using with a triazole fungicide use only approved tank-mixes.
 - **Utilize Drift reduction nozzles** to reduce herbicide drift into unwanted areas including pollinator plots.
 - Limit overspray- Allow wildflowers to grow beside your crop fields.
 - Lower booms and pressure rates during pesticide applications to reduce drifts- Droplegs are a good option as well... https://beecare.bayer.com/bilder/upload/dynamicContentFull/BEENOW/BEENOW_GB_dropleg_higher-protectioniwrsi02d.pdf
 - Check the wind speed is less than 5 mph, that nozzles are as close to the crop as possible, and appropriate nozzles are being used and properly cleaned - particularly important with older equipment.
 - Avoid spraying when bees are actively foraging. Spray in the **evening** or in the early morning when fewer bees and other important pollinators forage. Bees usually do not forage in significant numbers at temperatures below 50°.

- Consider using seed **without** neonicotinoid herbicide treatments or limit seed treatment dust in the field. https://monarchjointventure.org/images/uploads/documents/Risks_of_Neonics_to_Pollinators.pdf

- Consider not using neonicotinoids on outer 30 ft of fields (along buffers, edge of field and etc).
- Limit neonicotinoids use after emergence unless recommended by a professional agriculture consultant.
- Ensure there is no unnecessary agitation and abrasion of seed, leading to ‘dust’ containing insecticide being released into the air.
- Be aware of wind speed and direction during planting, particularly in areas with flowering crops or pollinator plantings.
- Ensure seed is planted correctly. To help protect the environment, clean planters and seed boxes in a way to minimize dust release and ensure treated seed is planted at the proper depth.
- Drill operators should minimize the presence of exposed seed left on the surface after planting. This includes on the field, field margins and loading areas.
- Ensure there is no leaching of seed dressing into puddles, wetlands and watercourses, recognizing that pollinators may use these as a water source.

- Identify nonproductive areas** and create habitat in odd areas on your farm, such as fallow fields, hedgerows, field margins, and in yards or gardens and take advantage of government programs to increase profitability of the farm.

- Utilize yield monitoring or computer programs to identify unproductive areas and consider enrolling these areas into existing voluntary conservation programs such as Conservation Reserve Program, Environmental Quality Incentives Program and Conservation Stewardship Program that can offer annual payments. These areas can improve profitability and enhance pollinator habitat on your operation.

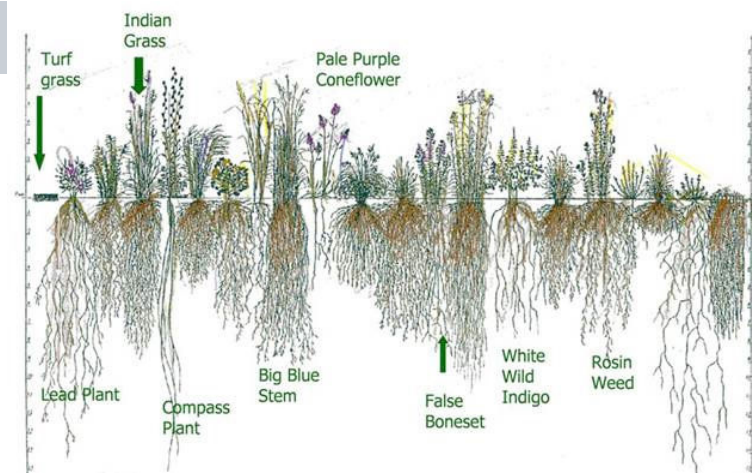


Photo courtesy of: Van Buren

- Consider installing a habitat restoration practice in odd areas of farm that are not profitable or are hard to reach. These areas will provide great habitat and decrease mowing efforts.
- Consider leaving riparian corridors along creeks and ditches that provide critical habitat for wildlife and increase water quality while improving yields on existing land. The root graphic above shows that native grasses and wildflowers have extensive root systems which are more effective at holding water in the soil profile than nonnative species.
- Identify existing guides and links to incentive programs and habitat evaluation guides that are available to producers who want to help pollinators. Examples can be found at: <https://monarchjointventure.org/get-involved/i-am-a/agriculture/>
- Consider native prairie or diverse grassland plantings for monarchs that can be incorporated into farm buffer systems such as filter strips, grassed waterways, roadside embankments, ponds, irrigation lakes and septic drainage fields. A combination of early, middle and late blooming species, with overlap in flowering times will fuel pollinators and butterfly during breeding and migration. https://efotg.sc.egov.usda.gov/references/public/MO/Monarch_Habitat_Information_Sheet_10_30_17.pdf

- Put the mower away!** Untimely mowing can result in high levels of insect mortality. Insect eggs, larvae, pupae and even adults may be killed directly by the mower. Mowing also destroys landscape features that provide structural diversity and may impact nesting areas used by pollinators.

- To limit mortality to monarchs and other pollinators, the following guidelines are recommended for established native plantings:
- Avoid mowing the entire habitat; instead leave refuge areas for wildlife using the site at the time of mowing. This will allow for recolonization of the mowed site. Leave areas that may be good nesting or overwintering sites (leaf litter, dead stems, and other ground cover) for pollinators or other wildlife.
- Consider leaving host plants in the area if mowing during peak reproduction. Marking known areas may prevent accidental mowing.
- Timing of mowing is critical- <https://monarchjointventure.org/images/uploads/documents/MowingForMonarchs.pdf>
- Avoid mowing during times of peak insect activity; this timing will vary between species. If your goal is monarch habitat, do not mow during times of high monarch reproduction or migration.
- If you must mow to control brush or invasive plants, consider mowing during the winter months or at least avoid mowing April 1 thru October 15 as to protect migrating monarchs.

- If mowing is necessary during summer mid-July is the best time to avoid destroying monarch caterpillars and monarchs themselves.
- If possible, avoid mowing while native plants are in bloom or before they have dispersed seed.
- Limit mowing to no more than twice per year, and even less if possible. Mowing too frequently disrupts plant growth and the ability of forbs to compete with grass species. However, during the first year of prairie restoration, more frequent mowing may be needed for weed control.
- Use a flushing bar and cut at reduced speeds (5 to 8 mph is adequate) to allow wildlife to escape prior to mowing. An example of a flush bar can be viewed in our Grazing BMP document.
- Use a minimum cutting height of 8-12 inches (shorter heights may be needed for early establishment mowing). Mowing at this height will effectively remove seed producing parts of most invasive plants while minimizing impact to native plants and many insects.
- Avoid mowing at night, when insects are inactive and unable to escape.
- When mowing, avoid cutting the milkweed if possible, so learn to identify milkweed species in your area. <https://monarchjointventure.org/images/uploads/documents/MilkweedFactSheetFINAL.pdf>



Photo courtesy of: Mark Ramsey