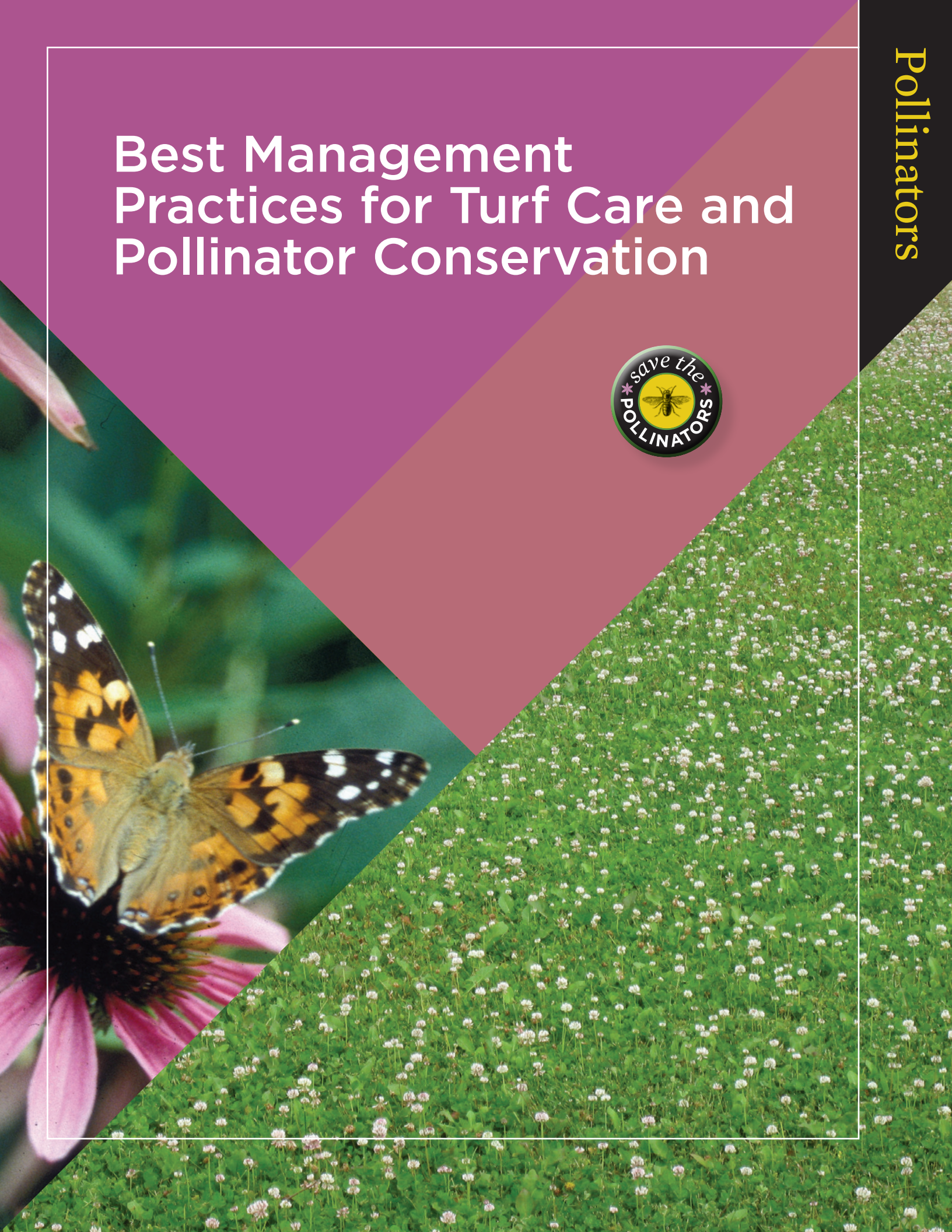
Best Management Practices for Turf Care and Pollinator Conservation

Pollinators



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This publication was developed during the National Pollinator Summit for the Development of Best Management Practices to Protect Pollinators in Turf (August 21–22, 2016, Sheboygan, Wisconsin). The authors, in collaboration with more than 60 university researchers, Extension specialists and industry stakeholders including lawn care professionals, golf course superintendents, managers and consultants, and product manufacturers have summarized and synthesized research and recommended management practices that protect pollinators in turf systems.

cover photo: Painted Lady, Daniel Herms, The Ohio State University, Bugwood.org

What are insect pollinators and what is happening to them?

Pollinating insects provide invaluable pollination services to crops like apples, almonds, blueberries and wild plants. Honey bees are the most recognized pollinating insect but there are over 4,000 species of wild native bees that also visit many plants, not to mention a wide variety of beetles, flies, butterflies, and moths. Populations of these important insects have declined in the last several decades due to numerous factors such as pathogens, parasites, habitat loss, and insecticide exposure. University research projects indicate that all of these stresses combined are responsible for pollinator decline. All of these issues must be addressed if we are to reduce declines and promote recovery. In the turf care industry, managers must be aware of this issue and professionals must implement scientifically-based recommendations for Best Management Practices that promote healthy turf while also conserving and enhancing pollinator health.

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Best Management Practices for pesticide use in turfgrass

Insecticides have been a focal point for concerns regarding pollinator decline, in particular the neonicotinoid class (including imidacloprid). Insecticides can have negative lethal or sub-lethal effects on pollinators, underscoring the need to be sure to always follow label precautions. This will include instructions for irrigating products to increase below ground efficacy and also remove residues from foraging zones of pollinating insects. While turf itself

Ansel Oommen, Bugwood.org

Honey bee (*Apis mellifera*) on butterfly milkweed.

may not bloom, flowering weeds are common in turf areas and are attractive to a wide variety of pollinating insects. If these weeds are present when applications are made, a scenario could arise where pollinators are harmed. To avoid direct contamination of flowering weeds in turf simply mow the flower heads of weeds like white clover, dandelion, bird's foot trefoil, etc. before treatment. If the insecticide label dictates you should not mow before treatment, follow-up the application with mowing to remove contaminated flowers. Controlling weeds with herbicides before insecticides are applied is another way to avoid direct insecticide contamination scenarios. There are other variables to consider before making an application though, such as the timing of the application, which formulation should be chosen, and which insecticide class to use.

In terms of seasonal timing, most insecticide applications in turf are made as preventative sprays between March and June. Unfortunately, this timing coincides with the blooming of flowering weeds and also the emergence of several species of pollinators. If turf managers can wait until May or June to make applications they can avoid exposing many pollinating insects. Managers can also adjust the time of day for insecticide applications. Since pollinators are typically most actively foraging during the middle of the day, consider restricting applications to the early morning or the late evening.

Turfgrass insecticides can be applied in various formulations but are mainly applied as granules or liquids. There are significant differences between these formulations and their effects on pollinating insects. In a study comparing neonicotinoid liquid sprays to their granular counterparts, when applied to flowering weeds in a turf setting, it was found that granular applications pose a reduced risk to pollinating insects. While both liquid and granular products are systemic, granular products rarely directly contaminate the

flowering portions of blooming plants. If a manager is trying to control below ground pests with a neonicotinoid, granules will accomplish this with reduced hazard to pollinators. While liquid formulations could pose more of a hazard by contaminating floral resources present at the time of application, this negative interaction can be avoided through irrigation or removal of flowering weeds with mowing or herbicide applications prior-to or post-bloom.

Certain insecticide classes better target certain pests, e.g. neonicotinoids being used for soil-dwelling white grubs or pyrethroids for leaf zone pests such as chinch bugs and caterpillars. Many classes, such as the neonicotinoids, pyrethroids, and carbamates, have documented negative effects on pollinating insects. Chlorantraniliprole, part of the newer anthranilic diamide class of chemistry, can control many of the same pests that are targeted with neonicotinoids and pyrethroids including white grubs, caterpillars, and billbugs. However, it does not have any documented effects on pollinating insects and may be a good fit for industry initiatives to reduce the impacts of turf and landscape management on pollinators.

Charles T. Bryson, USDA Agricultural Research Service, Bugwood.org

Monarch butterfly (*Danaus plexippus*).

Promoting pollinator welfare in and around managed turfgrass sites

Habitat loss is one of the main drivers behind pollinator decline. To help combat this problem turf managers can promote pollinator food resources and nesting habitats by creating pollinator sanctuary plots or naturalized areas. Depending on the type of turf area there will be different ways of creating forage for pollinating insects.

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Planting for pollinators on golf courses

Golf course managers and golf organizations such as the United States Golf Association (USGA) are actively increasing the acreage of natural habitats in out of play areas on golf courses. Initiatives like the Audubon Cooperative Sanctuary Program, Wildlife Links Program, Operation Pollinator, and the Golf and the Environment Initiative have all demonstrated that golf courses can provide a quality golfing experience while also serving as urban wildlife conservation areas. Not only do such programs benefit wildlife but they can also help to decrease golf course expenditures by reducing the acreage of managed turf and lowering the amount spent on irrigation, mowing, and chemical inputs. One notable project is Operation Pollinator, an international biodiversity project started by Syngenta in 2010. Operation Pollinator plots are placed in out of play areas on courses and superintendents can determine the habitat size that fits their needs. Syngenta provides participants with signage to mark conservation areas as well as educational materials to educate golfers and stakeholders about the project. One study found that Operation Pollinator plots attracted 51 unique bee species and identified wildflower species that were the most successful at attracting pollinators for their climatic area; New England aster, bergamot, black-eyed Susan, purple coneflower, plains coreopsis, prairie coneflower, and lanceleaf coreopsis. Superintendents and turf managers who are interested in establishing pollinator conservation plots should consult their local University Extension service to learn more about matching flowers with their climatic zone and should consult sources such as the Xerces Society or Pollinator Partnership for establishment advice.

Lawns and pollinators conservation

Golf courses are not the only managed turf areas that can contribute to pollinator conservation. Homeowners who have an interest in pollination conservation can plant their own Operation Pollinator style conservation plots or can take steps to make their yard and landscape more hospitable to these important invertebrates. While highly managed, typical turf lawns offer few foraging resources for pollinators, many lawns contain some flowering weeds such as white clover, *Trifolium repens* (Fabaceae), or common dandelion, *Taraxacum officinale* (Asteraceae). Deemed undesirable by some, these weeds represent a under recognized food source for pollinating insects. A 2014 study found that over 50 different species of pollinators visited these weeds and that urban pollinators rely on white clover as an important food source. Lawns that include rather than exclude clover are already being promoted due to their ability to withstand drought and the natural fertilization that comes from clover. Increased awareness of pollinator interactions with white clover may increase the acceptance of these plants in turf settings.

Conclusions

Professionals who apply pesticides must diligently follow label precautions when using insecticides including irrigating, mowing weeds before applications, and choosing the proper insecticide class and formulation. If industry practices good insecticide stewardship managers can control pests, reduce harm to beneficial insects, and ensure that insecticide tools stay available for use in turf. By diversifying golf courses and other turf areas the industry can take a proactive role in protecting pollinators by providing food plants and habitat while also educating the public about the importance of these insects in our environment.

Pollinators