Field Science I By Brad Park



ORGANIC MANAGEMENT and other systems employed in maintaining turfgrass

▲ Calendar-based preventative and curative applications can provide very good turf quality; however, the lack of site specificity can result in poorly timed and/or unnecessary fertilizer and pesticide applications. here is increased interest in turfgrass management strategies that are intended to reduce or eliminate synthetic pesticides and, in some cases, synthetic fertilizers. Consumers' desire for organic food and its perceived benefits has translated into a growing demand for turf products and contracted services described as 'organic' or 'synthetic pesticide free'.

While the mischaracterization of a turfgrass management program may be entirely unintentional, marketing non-organic products or services as organic has numerous consequences, most obvious the customer not receiving what is being sold. In some cases, where synthetic pesticide free programs or organic management have been deemed 'successful,' these successes have served as a rationale to legislatively prohibit synthetic pesticide use. These 'successful' programs may have, in actuality, incorporated synthetic fertilizer and synthetic pesticide applications at some recent juncture, requiring a more accurate description of the programs, albeit a description less marketable than 'organic.'

The objective of this article is to describe the following turfgrass management philosophies to better enable sports fields and grounds managers to sort-out common terminology used in the marketplace today: calendarbased preventative and curative applications; Integrated Pest Management (IPM); management without synthetic pesticides; and organic management.

For the purpose of clarity in this article, the term 'synthetic pesticide' includes products that meet each of the following criteria: 1) The product has a United States Environmental Protection Agency (EPA) pesticide registration number; and 2) The product is **not** approved for organic production per United States Department of Agriculture (USDA) National Organic Program (NOP) or Organic Materials Review Institute (OMRI) guidelines.

CALENDAR-BASED PREVENTATIVE & CURATIVE APPLICATIONS

Schools and municipalities are contracting-out pesticide and fertilizer applications at a more frequent rate. The lack of trained and licensed personnel, limited availability of application equipment, and other issues related to product storage have created a strong demand for contracted applications. Calendar-based preventative and curative application programs that have traditionally served the home lawn market are often employed in the management of public sports fields and grounds due, in large part, to the fact that they can be readily integrated into the public bid process.

Contractor-submitted bids are typically based on a scheduled application of fertilizer and pesticide products on a specified date (or range of dates), to a known acreage, and at label-derived rates. Realistically, calendar-based contracted programs may be the only avenue in which fertilizers and pesticides are ever applied to sports fields and grounds in a public setting. However, the environmental suitability of these applications is often called into question as onesize-fits all protocols can result in pesticide and fertilizer applications that are poorly timed and/or unnecessary.

INTEGRATED PEST MANAGEMENT (IPM)

While numerous definitions have been authored to describe IPM, no conventional definition addresses fertilizer selection nor entails the elimination of synthetic pesticide use. The following is a definition developed by the Rutgers Pest Management Office: *As a long-term approach to maintaining healthy landscapes and facilities that reduces the risk to people and the environment, instead of routine chemical applications, IPM employs site assessment and monitoring, and pest management tactics that include horticultural, mechanical, physical, and biological controls and selective use of pesticides when needed to keep pests within acceptable limits.*

Site assessment and setting pest thresholds (i.e. acceptable limits) are IPM principles that can be used to reduce the quantity of pesticides applied to sports fields and grounds. Town properties and school district sports fields and grounds can be subdivided into zones (e.g. A, B, and

C) based on turf function and aesthetic priority. Pest threshold levels can then be established for individual zones.

For example, a school district may classify certain sports fields and lawns as Zone A turf locations on the basis that they have the highest expectations for function (playing surface quality) and aesthetics; thus, these locations have the lowest threshold level for weeds, diseases, and insect pests. Examples of Zone A turf areas may include varsity sports and practice fields used by high school athletes and high profile lawn and grounds locations.

Zone B sports fields and grounds may include turf locations where stakeholders have a moderate expectation level for playing surface and aesthetic quality such as sports fields used by middle school athletes, passive recreation areas, and lower visibility lawns. A greater level of weeds, diseases, and insect activity can be tolerated given the less intense recreational activity, younger age of athletes, and/or lower aesthetic importance.

Sports fields and grounds designated as Zone C can be determined to have the greatest threshold for pest activity and may include sports fields used by elementary school students, 'alternate fields' that are always open to users when high value fields are closed, and turf locations where soil stabilization (no wind or soil erosion) is the primary function of these grounds.

MANAGEMENT WITHOUT SYNTHETIC PESTICIDES

Laws essentially prohibiting the use of synthetic pesticides on school sports fields have been implemented in the State of New York (playgrounds, turf, athletic or playing fields at day care centers and schools [kindergarten through grade 12]) and Connecticut (grounds

▼ Left: As part of an Integrated Pest Management (IPM) plan, middle school sports fields may be deemed to have a higher threshold level for broadleaf weed populations compared to high school varsity fields. **Right:** Failure to develop any pest management plan resulted in nearly complete white grub damage of this municipal baseball outfield during late September.





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of day care centers, elementary and middle schools [grade 8 and lower]). Additionally, at the time of the authoring of this article, a bill has been introduced in the New Jersey State Legislature prohibiting 'lawn care pesticide' use on the grounds of day care centers, schools, and sports fields at municipal, county and state park facilities. The proposed New Jersey Safe Playing Fields Act defines a 'lawn care pesticide' as "... any pesticide labeled, designed or intended for use on lawn, gardens, turf or ornamental plants". These laws and proposed bill provide allowances for 'emergency' pesticide applications per approval from varying authorities.

It is important to note that these laws and bill do not address fertilizer use; thus, it is a mischaracterization to state that organic management is being legislatively mandated in these cases.

The New York and Connecticut laws and proposed New Jersey legislation allow the application of Minimum Risk Pesticides. These products contain active ingredients that are exempt under Section 25b of the Federal Insecticide Fungicide Rodenticide Act (FIFRA) and do not require EPA registration (i.e. they do not require an EPA registration number) because the EPA considers their ingredients, both active and inert, demonstrably safe for the intended use. (www.epa.gov/oppbppd1/biopesticides/ regtools/25b_list.htm). Examples of minimum risk active ingredients included in products marketed for use in turf include, but may not be limited to: cedar oil, citric acid, clove oil, corn gluten meal, eugenol (oil of cloves), lauryl sulfate (sodium lauryl sulfate), 2-phenethyl propionate (2-phenylethyl propionate), sodium chloride (common salt), and sodium lauryl sulfate.

It is extremely important to understand the specifics of the laws under which one is governed. For example, pesticide products that have an EPA registration number are not allowed for use on the grounds of day care centers and elementary and middle schools in Connecticut, regardless of whether or not the product is approved for use in organic production (e.g. Avenger Weed Killer; OMRI-listed; EPA Reg. No. 82052-1; and M-Pede; OMRI-listed; EPA Reg. No. 62719-515).

A thorough evaluation of the success of a management program that excludes synthetic pesticides must take into consideration prior management history. Sports fields and grounds where synthetic herbicides and insecticides have been routinely applied typically have few weed and insect problems. Initiating a program (and maintaining acceptable turf quality) without synthetic pesticides on properties with minimal weed and insect problems presents less of a challenge compared to beginning such a program on turf riddled with annual and perennial weeds and/ or insect pests.

ORGANIC MANAGEMENT

The USDA NOP defines 'organic' as a labeling term that indicates that the food or other agricultural product has been produced through approved methods that integrate cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity (www.ams.usda.gov/AMSv1.0/nop). Materials allowed for use in organic production are either essentially derived from living things or naturally occurring minerals.

The USDA NOP definition underscores that organic management, to this point, has been employed primarily in agricultural production systems, as opposed to turfgrass and

▼ Left: Within a school district, the greatest broadleaf weed population can often be tolerated on the sports fields and grounds surrounding elementary schools. Right: This suburban New Jersey sports field has not received a synthetic pesticide application since 2009 (photo taken October 2013). Before this program, synthetic pesticides were routinely applied to the sports field which consisted of good turfgrass cover. Current cultural practices promote competitive turfgrass: regular mowing (3 inches), fertilization, and overseeding.





landscapes. The USDA NOP was developed to create standards for organic farming and administer organic certification – which verifies that a farm or handling facility complies with the USDA organic regulations and allow the sale, labeling, and representation of a product(s) described as organic.

To meet USDA NOP certification requirements for crop production, organic farmers are prohibited from applying non-conforming substances to the land for three years before the harvest of an organic crop. This requirement, albeit rigorous, preserves the integrity of products labeled organic and drastically contrasts with a recent effort to develop standards for organic land care (including lawns) that allows applications of non-organic materials under an 'Emergency Non-Organic Rescue Treatment' provision. The standards, developed by Northeast Organic Farming Association (NOFA), emphasize that emergency non-organic rescue treatments must be rare, must only be undertaken as a last resort, and must be approved by the client (www.organiclandcare.net/accreditation/standards). Where a pest population exceeds a pre-established threshold (established by the turf manager and/or client) and a synthetic pesticide is used reduce the pest population to an acceptable limit, the management system should be characterized as IPM.

In its broadest sense, organic turf management seeks to apply the principles of organic crop management to the maintenance of turfgrasses. A primary tenant of organic management is the emphasis on systems-based management as opposed to product-focused management. Synthetic pesticides and fertilizers are commonly applied using a calendar-based approach; organic-conforming products can be applied in a similar manner by simply removing the synthetic product from a calendar program and inserting an organic product. Organic philosophy discourages this type of simple input substitution as it is inconsistent with broader systems-based models that emphasize soil preparation, proper establishment methods, turfgrass selection, and cultural practices that favor healthy, competitive turfgrass.

Per USDA NOP guidelines, synthetic fertilizers, sewage sludge, irradiation, and genetic engineering may not be used in organic agricultural systems. "Materials for Organic Crop Production" (NOP 5034-1), currently in Draft Guidance form, lists materials (including some synthetic) that comply with USDA organic regulations (www.ams.usda.gov/AMSv1.0/getf ile?dDocName=STELPRDC5103311). Additionally, Organic Materials Review Institute (OMRI) is a nonprofit organization that provides organic certifiers, growers, manufacturers, and suppliers an independent review of products intended for use in certified organic production, handling, and processing (www.omri.org). The OMRI Products List is a directory of all products OMRI has determined are allowed for use in organic production, processing, and handling according to the USDA National Organic Program. To preserve the integrity of an organic turf program, turfgrass managers should confine their product choices to those that are OMRI-listed or can be found on the "Materials for Organic Crop Production" list. All too often, confusion arises over what materials are allowable as part of organic management. Restricting product use to those products that appear on OMRI and USDA NOP lists provides a level of validation that the system is being managed in a manner that can legitimately be characterized as organic.

An example of non-organic materials readily mischaracterized as organic involves 'organic-based' fertilizers. These fertilizers will often contain one or more natural organic fertilizer sources (e.g. bone meal, blood meal, feather meal, etc.) allowable in organic production but also contain synthetic nitrogen (N) sources and/or biosolids. Synthetic N sources and biosolids are prohibited for use in organic production; thus, when these materials are applied to turfgrass, the management system should not be characterized as organic.

Because there is no national organic program for turf management, the validity and integrity of an organic program is the responsibility of the turf manager, whether the manager is directly employed by the property owner (i.e. school or town) or working as a contractor.

CONCLUSIONS

The underpinnings of successful IPM, synthetic pesticide free, and organic turf management programs include sound agronomic decision making, as opposed to simply figuring out what products can be applied and when (including Minimum Risk Pesticide, organic-approved products, etc.). Examples of systems-based management include utilizing construction methods that preserve topsoil quality and if necessary amending soils with compost to improve soil organic matter; timely establishment and selection of the best adapted turfgrass species and varieties that have demonstrated lower disease and insect susceptibility; and properly executing all cultural practices including raising mowing heights to encourage more competitive turf and returning clippings to recycle nutrients. Systems-based management strategies for sports fields include the aforementioned in addition to frequent cultivation to alleviate soil compaction on native soil fields; aggressive overseeding to account for voids in the turf cover caused by traffic; supplying ample fertilization to ensure active turf growth and recovery; and using growth blankets to promote seed germination and turfgrass growth when soil and air temperatures discourage turfgrass physiological activity.

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