Golf Course Superintendents Association of America
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April 21, 2018

VIA E-MAIL

Mr. Steven Snyderman
OPP Docket
Environmental Protection Agency Docket Center (EPA/DC), (28221T)
1200 Pennsylvania Ave. NW,
Washington, DC 20460-0001

Re: EPA's draft ecological non-pollinator risk assessment for the registration review of imidacloprid

Docket ID: EPA-HQ-OPP-2008-0844-1260

The Golf Course Superintendents Association of America (GCSAA) is submitting these comments regarding the availability of EPA's draft ecological non-pollinator risk assessment for the registration review of imidacloprid. GCSAA is the professional association for the men and women who manage and maintain the game's most valuable resource — the golf course. The golf industry recognizes the association as a key contributor in elevating the game and business.

Since 1926, with a focus on golf course management, GCSAA has been the top professional association in the United States and worldwide. Headquartered in Lawrence, Kan., it provides education, information and representation to more than 17,000 members in more than 72 countries. Its mission is to serve its members, advance the profession and enhance the vitality of the game of golf.

The Benefits and Stewardship of Imidacloprid for Golf Course Use

The GCSAA would like to take this opportunity to provide comment on the importance and benefits of imidacloprid for insect control as part of the on-going registration review of this product and the neonicotinoid class of insecticides. Imidacloprid is a critical tool for golf courses throughout the U.S. with key uses for white grubs and other insects that impact turf with a high degree of effectiveness. Imidacloprid is also used to control key pests of ornamentals, trees and shrubs that are also part of the course. Alternate choices would greatly impact the cost of control or provide less effectiveness.

Imidacloprid also provides a high degree of worker and player safety, and flexibility in application. Stewardship practices used by golf courses minimize impact on pollinators, off-site movement and water contamination. These factors all contribute to the value and benefits of imidacloprid as a very important tool for golf courses and loss of uses would have negative impact on the industry.

Golf Course Basics

The U.S. golf course industry provides a high benefit to the national economy and public well-being. According to data compiled by the We Are Golf industry coalition (www.wearegolf.org):

- $176.8 Billion – Total economic impact of golf in America, including direct, indirect and induced impacts.
- $68.8 Billion – Total size of the golf economy nationally.
- $55.6 Billion – Total wage income from about two million U.S. jobs.
- 15,000+ – Approximate number of U.S. golf facilities, with more than 10,000 open to the public.
- $3.9 Billion – Charitable contributions

A large part of the golf game and experience is influenced by the quality and playability of the turfgrass, which must be protected from damage from various weeds, diseases and insects and managed properly to ensure its aesthetic quality and function. Both cool-season (C3 photosynthesizing) and warm-season (C4 photosynthesizing) turfgrass species are used dependent on the geographic and climatic suitability of the species for the course. An average golf course facility is 150 to 200 acres in size and is dominated by turfgrass with different functions and levels of maintenance. According to the 2017 Golf Course Environmental Profile: Land Use Characteristics and Environmental Stewardship Programs on U.S. Golf Courses (Phase II, Volume IV) report, on average, the turfgrass areas maintained are:

- Tees and Putting Greens – 6 acres
- Fairways – 28 acres
- Rough - 48 acres
- Driving Range and Practice Area – 6 acres

These areas must be maintained to standards of playability with tees and greens receiving the highest inputs, followed by fairways and then roughs.

Impact of Insect Damage on Golf Courses

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The economic impact of insect damage on golf courses is not easy to quantify based on the diversity of golf course offerings, settings and locations that impact factors such as cost and revenue from play, turf species used and the impact of the local environment on turfgrass damage recovery. Estimates from GCSAA members cited the cost per acre to renovate or replace damaged areas (including materials, labor and input) ranged from $800 to $4,000 per acre while sodding affected areas ranged from $15,000 to $40,000 per acre. The major difference in costs were reflected by the establishment time: 2-3 weeks for sodded areas and 1-2 months for newly seeded areas. The establishment time would directly impact the playability of the area and result in potential loss of playability and revenue for the course.

Key Uses of Imidacloprid on Golf Courses

Imidacloprid is applied to turfgrass as a liquid spray, in granular form or impregnated onto a granular fertilizer. Turf application equipment includes spray booms of less than 2 feet in height for liquid applications, and drop- and rotary-spreaders for granular forms and impregnated fertilizer. On ornamentals, imidacloprid may be applied as a soil treatment (liquid drench, granular, or tablet) or foliar spray. Since imidacloprid is xylem-mobile and systemic, and can be absorbed by roots, directed soil application can be used to systemically protect plants for significant periods of time, minimizing the need for repeated foliar sprays of other types of pesticides such as pyrethroids.

The low toxicity (category III) of imidacloprid makes it a good choice for reducing risk of harm to applicators and other golf course maintenance staff.

White Grubs

The primary use of imidacloprid on golf courses is for the control of the larvae of many beetle species. White grubs are the most widespread and destructive insect pest of turfgrass in cool-season and mixed cool- and warm-season turfgrass growing areas (Potter 1998).

Asiatic Garden Beetle	*Maldera castanea*
Black Turfgrass Ataenius	*Ataenius spretulus*
European Chafer	*Rhizotrogus majalis*
Green June Beetle	*Cotinus nitida*
Japanese Beetle	*Popillia japonica*

May/June Beetle	*Phyllophaga spp.*
Northern Masked Chafer	*Cyclocephala borealis*
Oriental Beetle	*Exomala orientalis*
Southern Masked Chafer	*Cyclocephala lurida*

Larvae of these species ('grubs') emerge from eggs laid in early summer and feed directly on turfgrass roots into the fall, enter fall – winter dormancy and resume feeding in the spring causing direct injury to turfgrass resulting in dead or damaged areas that impact course aesthetics and playability. Additionally, damage to turf occurs from raccoons, skunks, other small mammals, and many bird species birds foraging for grubs in turf during the fall through spring.

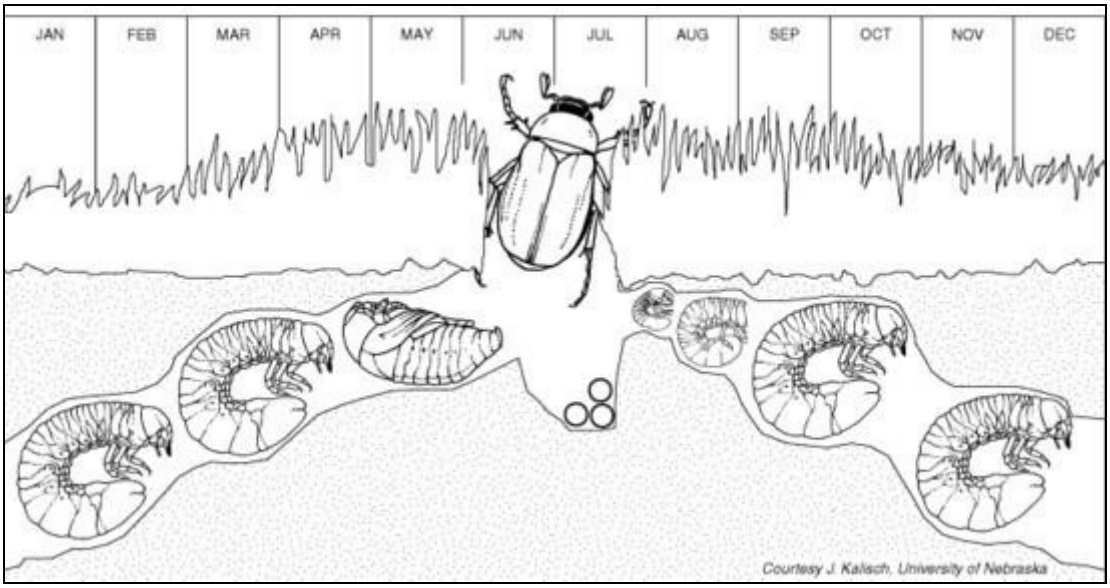

Figure 1. Life cycle of Japanese Beetle in turfgrass plantings. Illustration by J. Kalisch (University of Nebraska) taken from Potter, M. F. and Potter, D. A. 1999. Controlling White Grubs in Turfgrass. University of Kentucky Cooperative Extension Service.

Figure 2. Damage caused by small mammals and birds foraging for white grubs in turf.

Imidacloprid applications are made prior to egg laying and are most effective against emergent and young larvae. A single application of 0.3 to 0.4 lb. imidacloprid per acre typically provides season-long effective control of this pest.

Alternative chemical controls for white grubs would include chlorantraniliprole (Acelepryn®) or trichlorfon (Dylox®). Although highly effective, chlorantraniliprole costs approximately $120-240/acre for treatment while imidacloprid treatment ranges from approximately $9-15/acre for treatment. Although chlorantraniliprole can be used on limited portions of the course (greens, tees, parts of fairways), especially when other pest species not controlled by imidacloprid are present (armyworms, leaf feeding caterpillars, annual bluegrass weevil, sod webworm). The increased cost for using chlorantraniliprole only white grub control across the whole course would be significant and cost-prohibitive for many golf courses.

Trichlorfon is best used as a curative product due to its mode of action and physical characteristics. Unlike the preventive method that imidacloprid is used in, most trichlorfon applications are made to limited areas on courses as “rescue” treatments. Curative control would not prevent initial damage in many cases and sole reliance on these treatments would not be efficient. In addition to the increased cost (~$140/acre for application), trichlorfon could face additional use restrictions during its upcoming registration review.

Other chemical control options have been removed from the market, while others like carbaryl, a carbamate insecticide, will also face potential cancellation during registration review.

Biological control of white grubs has been mixed. Bacterial controls using *Bacillus thuringiensis* and other *Bacillus* species are available. Entomopathogenic nematodes such as *Steinernema kushidai* and *Heterorhabditis bacteriophora* are also available for control. Unfortunately, effective or timely control can be limited when using these biological controls alone. (Koppenhöfer et al. 2000)

European Crane Fly

Tipula paludosa (European crane fly) and *Tipula oleracea* (common crane fly) are invasive pests of turfgrass in the U.S. (Peck 2006) that have become established across the northern states from New England to the Pacific Northwest and Northern California. Damage can be significant on infested golf courses, and a high degree of control with imidacloprid can be achieved with a single preventive application made in the spring or fall window.

Alternative controls such as chlorantraniliprole and carbaryl have the same limitations as described above and biological controls such as *Steinernema feltiae* may only provide up to 50% control. (Sutherland, et al. 2009)

Chinch Bugs

The common chinch bug (*Blissus leucopterus leucopterus*), the hairy chinch bug (*Blissus leucopterus hirtus*), the southern chinch bug (*Blissus insularis*) and the western chinch bug (*Blissus occiduus*) can all be pests of turfgrass in the U.S. The Southern chinch bug has been an established pest of St. Augustinegrass in Florida and other southern states. Imidacloprid treatments are critical as part of the IPM strategy to control this pest, due in part to the high cost of replacing this vegetatively-propagated turf ($1 per square foot) and loss of control due to pyrethroid-resistance (AgInformatics 2014). Hairy chinch bug is reported to be a problem of increasing importance in northern parts of the U.S. due to changes in IPM practices and the selection of non-neonicotinoid insecticides in management plans.

Other turfgrass pests

Although white grubs are the primary target for imidacloprod use on golf courses, it does contribute to IPM plans as a rotation and tank-mix partner to provide control of a number of destructive insect pests in both cool- and warm-season turfgrasses on golf courses. These would include billbugs and mole crickets. For mole crickets, which cause considerable damage to golf course putting greens in the southeastern U.S., fipronil is commonly used to achieve effective control. As this insecticide is also under regulatory scrutiny, there are concerns that there will be use restrictions, and alternate tools like imidacloprid would not be available.

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Insect Control on Golf Course Ornamentals & Trees

Although turfgrass playing surfaces are the primary focus for golf courses, there is a need to manage the landscape and ornamentals to provide a positive experience surrounding the game. There are several key uses for imidacloprid for insect pest control on shrubs, trees and other ornamentals.

Common pests such as aphids, whiteflies, leaf miners, psyllids, and other piercing-sucking insects, as well as Japanese beetle adults, all can negatively impact ornamentals at golf courses. Due to the systemicity and residual of imidacloprid, many pests can be controlled with soil drench applications, minimizing worker and public exposure as well as off-target movement due to drift.

The systemicity of imidacloprid is especially helpful when controlling insect pests of trees would be difficult to control with foliar sprays which have limited effectiveness and increase the risk of off-site movement due to the difficulty of treating larger trees. Pests with a high economic impact such as wood boring beetles including emerald ash (Hermes et al. 2014), birch and flat-headed borers, and Asian long horned beetle (USDA 2017), as well as invasives such as wooly hemlock adelgid (Havill et al. 2016) are effectively controlled by imidacloprid.

Stewardship of Pesticides on Golf Courses

Today's golf course superintendents are educated professionals who care about environmental quality. Golf course superintendents have a high degree of pesticide stewardship and IPM education, due to a combination of state certification requirements as well as certification and training requirements set by GCSAA. Most of today's superintendents have college degrees and substantial continuing education. Superintendents are the nation's leading practitioners of integrated pest management, a philosophy that reduces the potential environmental risks of pesticide usage. Virtually all golf courses employ at least one state licensed pesticide applicator who is trained in environmentally sound pesticide use.

Pest problems on golf courses are often relatively predictable or can be diagnosed as part of an ongoing monitoring program. Once the problem has been identified, the superintendent considers the available options. These could include cultural practices (such as physically removing weeds, changing irrigation patterns or clearing underbrush around a problem area to allow more air movement) or the use of biological controls or chemical products. Once the problem is diagnosed and the right treatment has been selected, the superintendent waits for the ideal time to treat the problem in the most effective and environmentally sound manner available.

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GCSAA offers professional certification programs that enable golf course superintendents and golf course equipment technicians to be recognized at the highest level of their professions. The Certified Golf Course Superintendent (CGCS) designation is bestowed upon those who voluntarily meet the stringent requirements. The CGCS designation is the most widely recognized in the golf industry and the highest recognition that can be achieved by golf course superintendents. Certification is a three-part process that involves 1) determining your eligibility, 2) submitting the proper documentation and 3) planning for a lengthier yearlong application process done during the growing season.

Additionally, GCSAA has implemented national IPM and BMP guidance, setting voluntary standards that guide our superintendents to use the most sustainable practices that best steward the environment.

GCSAA has a goal that by 2020 all 50 states will have a comprehensive BMPs program at the state level. To support this initiative, GCSAA has provided its members and chapters a How To Guide. GCSAA's BMP Planning Guide and Template is an online resource that provides for the development of golf course best management practices (BMP) programs at the state level. The need for state-level BMP programs and, ultimately, golf facility-written BMP plans for nutrient, drought, and water management and integrated pest management (IPM) is greater than ever. Golf courses, many of which are in urban environments under the watchful eye of concerned citizens, face heightened scrutiny from the public, media and environmental activist special-interest groups regarding the use of inputs (that is, water, pesticides, etc.) and commonly held misconceptions about golf course management. It is critical that the golf industry demonstrate sustainable methods of land management. GCSAA's BMP Planning Guide and Template makes it easy for golf course superintendents to follow the key steps in developing a golf course management state BMP program.

Professional pest management is an integral part of golf course operations. From cultural practices, scouting and proper pest identification to actual pest control measures, the process requires skill, knowledge and training for success. That success comes from the golf course superintendent, the professional who is responsible for the golf course landscape. Proper planning, documentation and review of pest control practices, as well as all the cultural practices that provide for healthy turfgrass, are essential to the course operations.

A written Integrated Pest Management (IPM) plan provides the means to plan, document and demonstrate that professional aptitude and helps to ensure success. One can have healthy turfgrass without a written plan, but the turf itself is not evidence enough. The plan document

provides for sustainable operations and can also support budget and operational decisions. Having the written IPM plan is a best management practice and is identified within GCSAA's BMP Planning Guide and Template. It best portrays the professional pest management of the golf course landscape.

The IPM Planning Guide was produced by some of the most highly regarded turfgrass researchers in the field and will help with the incidence of unexpected turf quality problems, improve handling of them, promote proactive solutions and facilitate internal communications and timing, all while focusing on your particular assets. The IPM plan is a living document and can be easily developed and maintained through GCSAA's IPM Planning Guide.

Pollinator Protection

In 2016, academic, industry and applicator groups met to establish best management practices to protect pollinators from insecticide applications to turf. Much of this work was based on studies examining the effect of mitigations on reducing pollinator exposure to imidacloprid (Gels et al. 2002, Larson et al. 2015). Practices such as removing flowering weeds, using granular forms, watering in liquid applications reduced exposure by >98% and resulted in no significant effects on the tested pollinator populations. These mitigations were developed into best management practices (Larson et al. 2016). Further, most neonicotinoid applications to golf course fairways, greens, and tees are being made to turf surfaces that have few, if any, flowering weeds that are attractive to bees and other pollinators.

Conclusions

Imidacloprid is a critical tool for golf courses that is needed to control white grubs and other insect pests that can have a high economic impact for direct damage recovery costs as well as loss of revenue. The effectiveness of product, its breadth of activity and utility in controlling difficult pests would be hard to replace, and some of the alternatives have significant economic and environmental disadvantages.

Superintendent education and certification requirements, as well as GCSAA IPM and BMP initiatives help provide an additional level of stewardship for this insecticide. Additionally, collaborative efforts between researchers, industry and applicator groups have helped establish BMPs that effectively mitigate the potential risk of pollinators to pesticide applications including imidacloprid.

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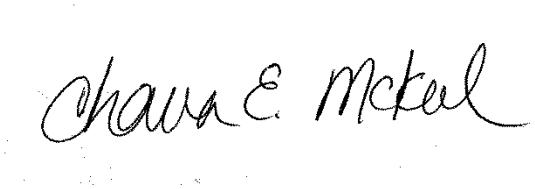
Finally, GCSAA is aware that the other neonicotinoids including clothianidan, thiamethoxam and dinotefuran are also under expedited registration review and we hope that many of these general comments regarding imidacloprid will also apply to these neonicotinoids.

Thank you for allowing GCSAA to submit the above comments to the agency. Please contact me at (800) 472-7878, ext. 3619 or cmckeel@gcsaa.org if you have additional questions or if you need additional information.

Sincerely,



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