The development and implementation of a networked IPM strategy on golf courses in Ontario and Québec.

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This project is aimed to improve standards and methods from research-based information for the development and implementation for IPM management on golf courses in Ontario and Québec. Precise information on seasonal development, distribution and ecology of major turfgrass insect pests and diseases collected on golf courses in Ontario and Quebec will be computed, organized and transferred via a web site (Real-time Alarm System) for access in real-time to all scouted sites by the superintendents. In addition, the data will be used to generate predictive models and integrated in a modelling and forecasting software system (CIPRA) delivered directly to the Canadian turfgrass managers. This will provide a decision making tool and will contribute to reduce pesticide inputs by: accurate identification of turfgrass pests, prediction of disease and insect outbreaks, improve timing of the needed applications and reduce number of pesticide applications. Scouting on numerous golf courses from different geographic areas in eastern Canada will also allow us to isolate and identify potential beneficial organisms to control turfgrass pests retained under golf course management system.

Cross-adaptation to biotic and abiotic stresses in overwintering ecotypes of annual bluegrass (Poa annua L.)

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Unseeded annual bluegrass is an important component of putting surfaces of golf courses in many regions of Canada and northern U.S.A. Freezing stress and infection of cool-season grasses by pink and gray snow mold diseases under deep snow covers and impermeable tarps often result in widespread damage to golf greens that significantly decrease the quality of putting surfaces for many weeks in the spring. Alternatives to current preventive applications of fungicides in the fall are required in order to apply low pesticide maintenance programs. The development of seed sources more tolerant to freezing temperatures and snow mold is one the most effective and sustainable approach to improve winter survival and quality of spring regrowth of overwintering grasses in a low input system. The main objective of this project is to identify physiological and biochemical traits that confer cross adaptation to both snow mold and freezing temperatures in annual bluegrass. This information will be used to assist the development of seed sources more broadly adapted to winter stresses. This project will also contribute to the development of best management practices (BMP) to optimize winter survival while reducing pesticide use.

Novel Bioherbicide for Sustainable Turfgrass.

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Weed control in golf courses has relied almost exclusively on chemical herbicides. 2,4-D and three-way mixtures have provided excellent control of most broadleaf weeds in turfgrass. But strong negative public perception of potential public health and environmental hazards associated with pesticide use have led many municipalities in Québec, Ontario and other Canadian provinces to implement bylaws that ban or severely restrict the use of pesticides on public and private property. Golf course operators are under pressure to reduce or eliminate pesticide use at their facilities. Research is needed to discover and develop alternative weed control strategies for turfgrass. To this end, a naturally occurring plant pathogen is being evaluated as a possible biocontrol of dandelion and other broadleaf weeds in turf with the bioherbicide. Results have been very promising with the bioherbicide in residential turf environments, but the biocontrol has not been tested in the more highly managed golf course environments. Research supported by the Canadian Turfgrass Research Foundation (CTRF) will evaluate the biocontrol on four golf courses in the Montreal region; all members of the "Coalition pour un Golf Responsible". The objectives of the research are to evaluate and optimize the biocontrol of broadleaf weeds on fairways, greens and roughs and to work with superintendents to integrate this biocontrol strategy within golf course management activities.

Organic Control of Snow Molds

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The purpose of the proposed work is to investigate an organic control strategy for turfgrass snow molds, using tissues of cruciferous species. These plant tissues are known to contain natural antifungal compounds, namely glucosinolates and their by-products, which are liberated as the tissues decompose. Examples of cruciferous species high in such compounds are wild mustards and wasabe (green condiment used when eating sushi) which have a bitter or spicy flavour. If this line of research is promising, and if synthetic pesticides come under even tighter regulations, then this work could lead to selection and breeding of particular crucifer varieties containing high levels of antifungal compounds or antifungal breakdown products that could be marketed specifically for "winter injury". Such products would not necessarily fall under the Pest Control Products acts and hence would not require extensive toxicological testing. This work has the potential to find a truly innovative biological control for snow mold.

The CTRF is a partnership of the Canadian Golf Superintendents Association, Golf Canada and seven regional turfgrass associations and foundations.

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