

# Municipal IPM Lawn Demonstration Project – Final Results From Year 3

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The Municipal Integrated Pest Management Lawn Demonstration Project began in spring 2003 and continued until fall 2005. This project compared and demonstrated the effectiveness of conventional, Integrated Pest Management (IPM), alternative, and no-pesticide approaches to lawn maintenance.

The conventional approach uses chemicals exclusively for pest control. IPM is a process that uses all the necessary techniques to suppress pests and sustain healthy landscapes. This is achieved by monitoring turfgrass to prevent problems and using thresholds and life cycles to decide how and when to treat pests. The alternative management program uses organic pesticides, corn gluten meal and Nature's Weed & Feed (a beet juice extract), for pest control. Lastly, no pest control is applied under the no-pesticide management program.

This was the third year of having no pesticides applied to these plots. The trial was established in three municipal settings (Guelph, Brantford and London) to show the impact that different lawn maintenance programs have on areas with slightly different microclimates, pest pressures and soil types. Figure 1 shows the overall layout of plots at the GTI in Guelph. This study also provided an opportunity for education and communication with area residents, municipal staff and turf managers regarding the different alternatives of lawn care programs.

## Study Description

The study was established in three municipal settings: Guelph, Brantford and London. At Guelph, the plots are located at the Guelph Turfgrass Institute (GTI). There are 32 plots, 9 x 5.5 m each, with a total demonstration area of 1584 m<sup>2</sup>. There are four management programs being ap-

plied to this area and they include: conventional, IPM, alternatives and no-pesticides (see the Spring 2005 issue of the *Sports Turf Manager* for tables of the plot plans for all three sites). At Brantford, the plots are located at the Glenhyrst Art Gallery near the Grand River. There are 24 plots, 7 x 5 m each, with a total demonstration area of 840 m<sup>2</sup>. There are three management programs and they include: conventional, IPM and no-pesticides. Lastly, in London the plots are located at Watson Park near the Thames River. There are only two management programs at this location: IPM and no-pesticides, and the study consists of 16 plots, 10 x 4.5 m each, with a total demonstration area of 720 m<sup>2</sup>.

In all three municipal settings, the demonstration trials were set up on established, predominantly Kentucky bluegrass turf with an existing moderate level of weed infestation. The plots of each demonstration trial were divided into four lawn care



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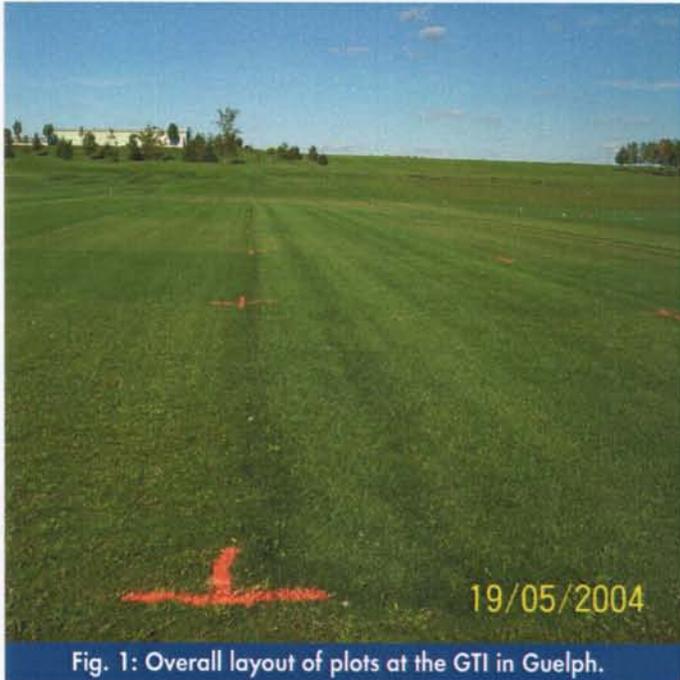


Fig. 1: Overall layout of plots at the GTI in Guelph.

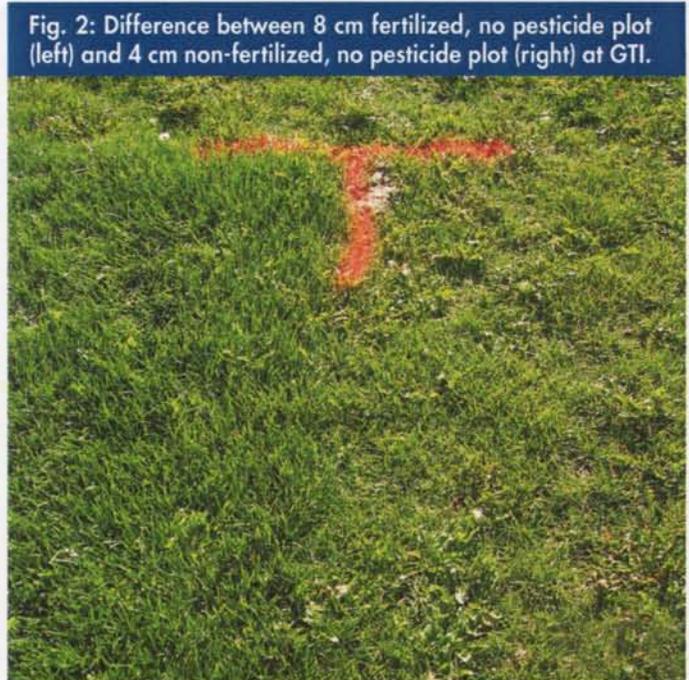


Fig. 2: Difference between 8 cm fertilized, no pesticide plot (left) and 4 cm non-fertilized, no pesticide plot (right) at GTI.

management programs: conventional, IPM, alternative and no-pesticide. Within each management program, the plots were subdivided into three superimposed treatments including: fertility (0 kg N/100 m<sup>2</sup> vs. 2.0 kg N/100 m<sup>2</sup>), mowing height (4 cm vs. 8cm) and irrigated vs. non-irrigated to demonstrate the effect that these treatments have on turf quality. The amount of irrigation was based on rainfall values. Unlike the previous two years, this year there was little rainfall and the effects of irrigation vs. non-irrigation could be observed.

The trial started at all three locations in late May and continued until mid-November. Visual ratings and mowing were carried out weekly while the application of fertilizers, monitoring of pests, and the application of pest controls were carried out according to each of the four management programs and their superimposed treatments. A summary of the monitoring and insect sampling techniques is provided in Table 1 of the Spring 2005 issue of the STM.

### GTI Results

**Turf Quality:** Overall turf quality was highest in conventional plots, followed by IPM, alternative and no-pesticide plots, respectively. More specifically, the conventional, fertilized 8 cm plot and the IPM fertilized 4 cm plot had the highest over-

all ratings. In addition, turf quality within each management program was affected by the superimposed effect of fertility and mowing. Fertility improved turf colour, density and showed a drastic reduction in the weed population (see Fig. 2). Lastly, a higher mowing height (8 cm) improved turf density and made a large, observable difference in colour.

**Broadleaf Weed:** After each broadleaf herbicide application, there was a noticeable reduction in broadleaf weeds throughout the conventional and IPM plots. These results show that continual management through conventional or IPM methods reduce overall weed coverage. As for the alternative plots, the percent weed cover was similar throughout this season. In the no-pesticide plots, the percent weed cover decreased 15.93% in comparison to last year, although the amount of clover did increase.

**Crabgrass:** Crabgrass was not found in any of the plots of all four management programs. The effect of conventional, IPM and alternative programs on crabgrass control could not be examined.

**Turf Insects:** Neither hairy chinch bug nor sod webworm was found in any of the plots of all four management programs. Only one grub was found in a no-pesti-

cide plot, which is below the IPM threshold level of grubs, therefore no treatment was necessary.

### Brantford Results

**Turf Quality:** Overall turf quality was highest in the conventional plots, followed by IPM and no-pesticide plots, respectively. The application of fertility and higher mowing height also improved the colour and density of the turf. In all six 8 cm, fertilized plots, it was observed that grass clippings were damaging parts of the turf. This caused some turf to die completely, leaving large bald spots in the plot. Fortunately, by the end of season three, these spots had almost completely recovered, Fig. 3.

**Broadleaf Weed:** Percent reduction in broadleaf weed cover was barely observable in conventional plots because they had very few broadleaf weeds to start with. In the IPM plots, reduction in broadleaf weed cover has been observed. The no-pesticide plots showed a general reduction in broadleaf weed cover over the season and the percent broadleaf weed cover was much higher in the non-fertilized than the fertilized no-pesticide plots.

**Crabgrass:** Crabgrass was found in all three management programs but in num-



Fig. 3: Recovering turf areas affected by grass clippings in Brantford.

bers below the IPM threshold level of crabgrass. All IPM plots were spot treated with a herbicide. As a result, this treatment completely cleared the conventional plots of crabgrass and drastically reduced crabgrass amounts in the IPM plots.

*Turf Insects:* Hairy chinch bug, sod webworm and grubs were found in all three management programs but in numbers below their IPM threshold levels.

### London Results

*Turf Quality:* Overall turf quality was higher in the IPM than the no-pesticide plots. In addition, turf quality within both management programs was affected by the superimposed effect of fertility and mowing. Applying fertilizer and mowing at a higher mowing height improved the colour and increased the density of turf.

*Broadleaf Weed:* Percent broadleaf weed decreased over the season in the IPM plots and remained relatively the same throughout the season in the no-pesticide plots.

*Crabgrass:* Crabgrass was found in the plots of both management programs, but in numbers below the IPM threshold level for crabgrass. Hence, all plots that contained crabgrass were spot-treated rather than broadcasted with herbicide.

*Turf Insects:* Hairy chinch bug, sod webworm and grubs were found in both management programs but in numbers below their IPM threshold levels. No treatment was necessary.

### Effect of Fertility on Broadleaf Weed Cover (All Locations)

The application of fertilizer has been observed to improve turf quality by increasing the 'greenness' and density of turf under all four management programs (Fig. 4). In addition, the percent broadleaf weed cover was greatly reduced in fertilized plots as compared to non-fertilized plots. The difference in turf quality between fertilized and non-fertilized in the no-pesticide plots has been drastic. Over the three seasons of the project, it has been

observed that broadleaf weeds have decreased in the no-pesticide plots in all three municipalities.

### Effects of Irrigation vs. Non-Irrigation

This was the first year that showed differences between the irrigation and non-irrigation plots. Specifically, GTI showed the most drastic results. The non-irrigation plots went completely dormant for a week, see Figure 5. Fortunately, these plots recovered and the drought had no real effect on the amount of pests found.

### Overall Pesticide Reduction

The breakdown of the number of pesticide applications among the four lawn care management programs in the three municipalities is illustrated in Table 2 in the Spring 2005 issue of STM. Overall, there was a 50-66.67% reduction in the number of pesticide applications in the IPM plots as compared to conventional plots in Brantford and London. This is the same reduction as last year.

## Educational Opportunities

There were different types of communication and educational opportunities available throughout the season. At the Brantford location, a sign illustrating the purpose and method of the project was created and it provided information on the project to members of the public that pass by the park of the Glenhyrst Art Gallery. In London, questions regarding the project were sometimes asked by the users of Watson Park. The results from Year 1 and 2 were reported at the Ontario Turfgrass Symposium and the Landscape Ontario IPM Symposium in 2004 and 2005. Visit [www.gti.uoguelph.ca/OPAC](http://www.gti.uoguelph.ca/OPAC) to view these reports. Results from the three years will be presented at OTS 2006 and the 2006 LO IPM Symposium.

## Conclusions

Turf quality was highest in conventional followed by IPM, alternative and no pesticide programs. Despite the 50-66.67% reduction in the number of pesticides used, the quality of the turf in IPM plots was reduced only slightly. In addition, mowing at a higher height (8 cm) improved the density of turf, while the application of fertilizer improved turf colour and density and reduced broadleaf weed cover in the no-pesticide plots.

Turfgrass insects were not an issue in all three municipalities. They were all present in numbers below the threshold for IPM pest control. Crabgrass infestation was also not a problem. It was only found at Brantford and London in numbers below its IPM threshold level. As for broadleaf weed cover, a couple of trends were observed. The no pesticide plots experienced a decreasing trend of broadleaf weed coverage from Season 2 to Season 3. Also, fertilizer greatly decreased the amount of broadleaf weed infestation. This can prove to be an alternative way to manage weeds without using pesticides.

The cumulative results of the past three years have shown that IPM is a more environmentally friendly and efficient method of managing pests in turfgrass in comparison to conventional methods. It was also found that using fertilizer alone can greatly control broadleaf weeds and may be less costly than using pesticides all together.



Fig. 4: GTI. Difference between the 4 cm non-fertilized (left) and 8 cm fertilized (right).



Fig. 5: GTI. The effects of no irrigation and limited rainfall on the non-irrigation plots.

The next step of this project is to educate members of the community about the advantages of using IPM on their own lawns rather than conventional methods. By spreading the word, we can help protect the environment and have beautiful lawns as well.

For further information regarding this project, please visit the project website: [www.gti.uoguelph.ca/OPAC](http://www.gti.uoguelph.ca/OPAC). It contains general information, photos, presentation slides and final reports of the project. ♦

## Acknowledgements

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