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Letter to Senator Antoine Thompson

While I applaud the New York State Senate in their efforts to protect the health and safety of citizens of the State of New York, it is my professional-scientific opinion that the proposed law to ban the sale and use of lawn fertilizers that contain phosphorus will not significantly reduce the problems of phosphorus in the surface waters in New York State.

RE: NYS Senate Bill S3780-Relates to phosphorus in household cleansing products and lawn fertilizer

Dear Senator Thompson,

My position at Cornell University is a turfgrass scientist and as a member of the Cornell University Nutrient Guidelines Committee I am responsible for the fertilizer recommendations for turfgrass sites in New York State. I am an expert on the environmental fate of fertilizers applied to lawns and development of best management practices to protect water quality (see attached CV). I felt compelled to write to you stating my professional opinion on the proposed law to restrict the sale or use of phosphorus fertilizer on lawns and non-agricultural turf in New York State. While I applaud the New York State Senate in their efforts to protect the health and safety of citizens of the State of New York, it is my professional-scientific opinion that the proposed law to ban the sale and use of lawn fertilizers that contain phosphorus will not significantly reduce the problems of phosphorus in the surface waters in New York State. It is not my role as a university professor to recommend approval or rejection of such a law but to provide an unbiased scientific review of the law and its impacts. What follows is a point by point review of the following proposed law:

§ 17-2103. Sale or use of phosphorus fertilizer restricted.

1. No person shall use or authorize any person by way of service contract or other arrangement to use in this state any phosphorus fertilizer on lawn or non-agricultural turf, except when:

(a) A soil test indicates that additional phosphorus is needed for growth of that lawn or non-agricultural turf; or

(b) The phosphorus fertilizer is used for newly established lawn or non-agricultural turf during the first growing season.

"Phosphorus fertilizer" means fertilizer in which the available phosphate (P205) content is greater than 0.67 percent by weight. Phosphorus fertilizer does not mean compost or bio-solids.

Based on all the available scientific literature (Soldat and Petrovic, 2008), I believe that the only way the phosphorus in a lawn fertilizer will end up running off in to surface water is:

1) if the fertilizer is misapplied to a hard surface like a driveway, side walk or in the road (that is not cleaned up) that is connected to the storm drain system; or

2) there is heavy rain shortly after the fertilizer is applied that results in runoff, or

3) when soils become saturated during wet times and the soils have extremely high phosphorus level, or

4) when water runs off the lawn, phosphorus in the grass leaves leaches out and moves with the water. The phosphorus in the grass leaves is not highly influenced by how much phosphorus is applied or the amount in soil, thus, explaining why there is very little correlation between the amount of phosphorus applied to lawns and the amount of phosphorus that runs off.

The first three conditions seldom occur in New York, but if they do, it can result in large amounts of phosphorus in runoff. The fourth I believe is where most of the small amount of phosphorus that runs off

from lawns comes from.

Concerns about the effectiveness of soil testing to reduce phosphorus runoff from lawns:

While I am a strong proponent of using soil testing to base fertilizer application on, basing the application of phosphorus containing fertilizers on soil testing may not result in the intended improvement in water quality, especially as the proposed law would be based on plant need level. Granted if a soil test indicates no phosphorus was needed this would prevent the first condition listed above that could lead to phosphorus runoff from lawns, miss-applying fertilizer to an imperious surface tied to storm drain system. There are two numbers related to soil test levels of phosphorus that should be pointed out: the amount needed for sufficient plant health-sometimes referred as the agronomic level. The second is the environmental impact level above which the soil phosphorus level is very likely to result in phosphorus runoff especially if more phosphorus fertilizer is applied. There is a big difference in the amount of phosphorus in runoff from at high soil test from an agronomic perspective (4 lbs/acre on the Cornell soil test report) and levels that are high enough to create a significant and meaningful increase in the amount of phosphorus in runoff from lawns, the environmental threshold (greater than 80 to 100 lbs/acre on the Cornell soil test report). Our research (Soldat and Petrovic, 2009) has shown that fertilizing lawns in NY with phosphorus when the soil test phosphorus level was above agronomic level but below the environmental level did not result in more phosphorus runoff. Thus if the goal is reducing phosphorus runoff from lawns, then the law should be amended to indicate lawns should not be fertilized with phosphorus when the level is above the environmental threshold.

Concerns about compost and biosolids not being restricted:

Composts, including manure based materials, and biosolids are sold as fertilizers and do often contain very high amount of phosphorus compared to nitrogen (1 part nitrogen to ½ to 1 part phosphorus), unlike most lawn fertilizers sold that have only a small portion of phosphorus compared to nitrogen (5 to 10 parts nitrogen to phosphorus). Fertilizer application rates are most often related to the amount of nitrogen, thus if compost or biosolids fertilizers are used much more phosphorus is applied than a typical lawn fertilizer which could result in excess phosphorus that could pollute surface water. Are the compost and biosolid fertilizers exempt from this law or just composts and biosolids that are used as soil amendments? In either case, whether as a fertilizer or soil amendment, they should not be exempt from this law because their use can result in very high soil phosphorus levels than have been shown to cause significant phosphorus runoff from lawns (Soldat and Petrovic, 2009). Therefore, if the goal is to limit the amount of phosphorus applied to lawns, all sources of phosphorus applied to lawns should be limited not to only just lawn fertilizers. Thus, any organic matter sources, including manures, composts and biosolids, should be tested and their use restricted (banned) if they contain phosphorus as is proposed for lawn fertilizers. Organic sources of phosphorus do not necessarily limit phosphorus runoff, especially when used are highrates.

Lack of evidence that such a restriction will improve water quality:

To my knowledge there is no scientific evidence that banning the fertilizing of

To my knowledge there is no scientific evidence that banning the fertilizing of lawns with phosphorus fertilizers will reduce the amount of phosphorus in New York watersheds that are impacted by too much phosphorus.

I believe the New York State Legislature should identify the areas (soils prone to large amount of runoff and that have high soil phosphorus level) most prone to large amount of phosphorus runoff and make restrictions on these areas. There should be a restriction on the mis-application of fertilizers to impervious sites like roads, driveways and sidewalks and if this happens it must be cleaned up.

lawns with phosphorus fertilizers will reduce the amount of phosphorus in New York watersheds that are impacted by too much phosphorus. There is one Minnesota case study comparing sub-watersheds that have phosphorus and phosphorus–free fertilized lawns on phosphorus runoff. First and foremost, governmental policies and laws must be based on science. A case study is not peer-reviewed scientific publication. The peer review process is designed to do two things: one being to validate whether the conclusions can be justified based on soundness of how the study was conducted, the statistical analysis is appropriate and the interpretation of the data is valid, and second to improve the overall quality of the final publication. This is not to say all peer-reviewed scientific publications are good and that non-peer review work is not valid but it is one of the few ways we have to evaluate the validity of a research study. Most scientific journal editions strongly discourage authors from citing non-referred work because of the reasons listed above (mostly importantly are the conclusions valid). Second, can the findings be extrapolated from a study done in Minnesota to New York? The site of the Minnesota study was a very high runoff prone lawn containing sub-watershed with little or no trees (tree leaves can be a significant sources of phosphorus in suburban watersheds in New York, Easton and Petrovic, 2008), which is likely appropriate on only a small portion of the three million acres of turfgrass in New York.

Most effective ways to reduce phosphorus runoff from lawns:

I believe the New York State Legislature should identify the areas (soils prone to large amount of runoff and that have high soil phosphorus level) most prone to large amount of phosphorus runoff and make restrictions on these areas. There should be a restriction on the mis-application of fertilizers to impervious sites like roads, driveways and sidewalks and if this happens it must be cleaned up. The Legislature should consider requiring best management practices with educational efforts to inform turfgrass managers and residential lawn owners on the best ways to protect the environment and to have healthy functional turf sites.

I would be glad to discuss these issues further with you and the Senate Environmental Conservation Committee if you feel it is necessary.

A. Martin Petrovic
Professor of Turfgrass Science

Literature Cited

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