

## Storage Carbohydrate Content of Creeping Bentgrass Receiving Multiple Applications of Growth Retardants

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The total nonstructural carbohydrate (TNC) content of plant tissue is an indirect estimate of the reserve energy available to plants. Carbohydrate reserves are essential for the survival and tissue production when the respiration rate exceeds photosynthetic activity. The total nonstructural carbohydrate content of plant tissues are often used as an indicator of the physiological stress status of a turfgrass. Turfgrass growth retardants (TGR) may affect accumulation and distribution of nonstructural carbohydrates among plant tissue. Consequently, this change could affect positively or negatively turf tolerance to environmental stress or its recuperative potential from damage or injury.

<b>Research Protocol:</b>	<b>Storage Carbohydrate Flux of Turfs Receiving Sequential Applications of Growth Retardants</b>
<b>Location:</b>	Greenhouse of Plant Science Lab; Urbana, IL.
<b>Turf :</b>	“Penncross” Creeping bentgrass.
<b>Treatments:</b>	growth regulator - Primo (0.25 lb ai/A), Cutless (0.5 lb ai/A), Scott’s TGR (0.25 lb ai/A).
<b>Application intervals:</b>	single application, every 2 weeks ; every 4 week applications during first 2 months.
<b>Turf Maintenance:</b>	mowing height - 1.0 inch, mowed every other day; fertilization - 16.7 lb N/A/week.
<b>Tissue sample:</b>	root and shoot (every 2 weeks for 4 months).
<b>Measurement:</b>	storage carbohydrates and root dry weight.
<b>Experimental Design:</b>	factorial arrangement in a RCB; 5 reps.

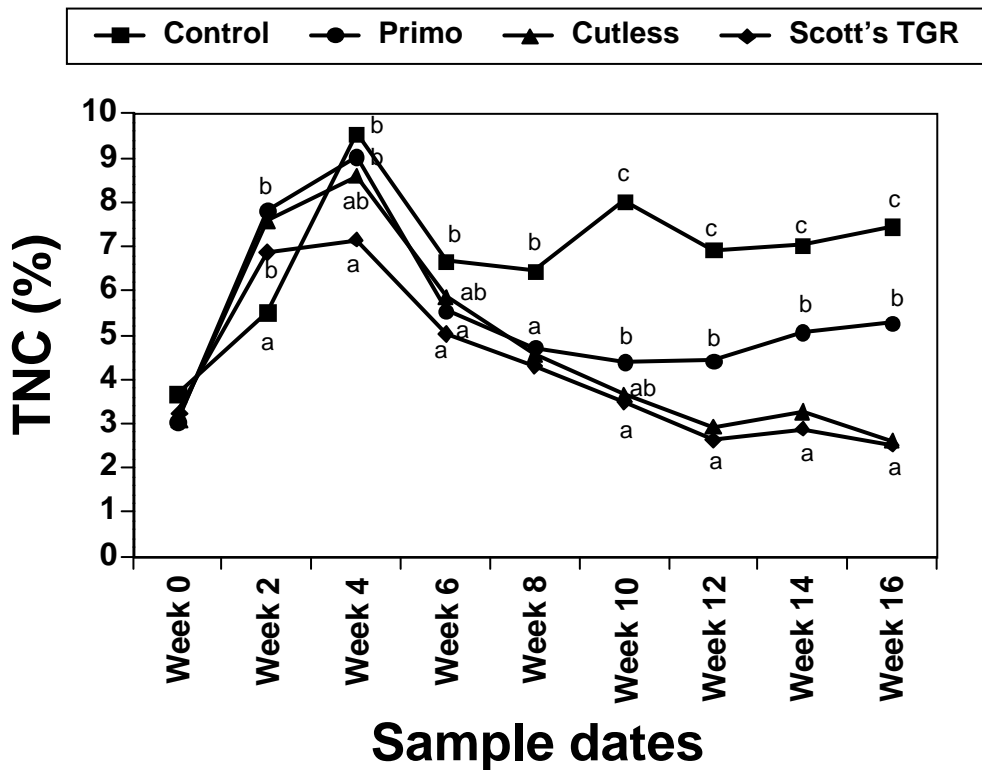
Since TGR applications are becoming more common place in fine turf management, detailed information on the influence of TGRs is needed to utilize TGRs correctly and efficiently. A single application of TGRs will suppress turf growth for a short period, generally for 4 to 10 weeks. Thus, the determination of carbohydrate status of turfs receiving multiple applications of growth retardants could be useful for long term programming of the use of TGRs.

Objectives of this study were (1) To determine the long-term storage carbohydrate dynamics of turfs receiving multiple application of turfgrass growth retardants (2) To determine TGR effects on the storage carbohydrate status at different application intervals and total rates.

Primo, Cutless and Scott's TGR significantly increased total nonstructural carbohydrates (TNC) of creeping bentgrass at 2 weeks after their application but TNC began to decrease at 4 WAT compared to the control (Figure 1). However, there was no clear difference among the different application intervals (Figure 2). For root tissue, creeping bentgrass treated with Primo had higher quantities of total nonstructural carbohydrate for all sampling dates as compared to the control, Cutless, or Scott's TGR treated turf (Figure 3). There were no differences in root TNC content among different application intervals (Figure 4). Creeping bentgrass treated with Primo, Cutless, or Scott's TGR also showed more root dry weight than the control (Figure 5).

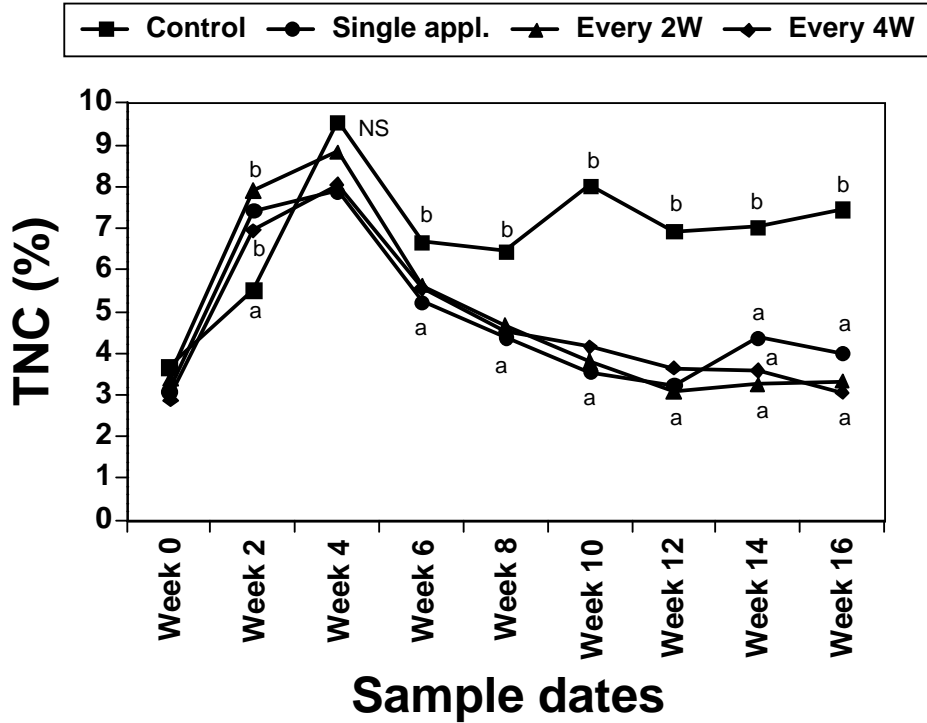
Turfs receiving growth regulators had unacceptable visual discoloration during the hot summer in the greenhouse, which indicates that the inappropriate use of growth regulators during stressful periods may cause unexpected damage. These findings are the preliminary results of continuing studies and should not be translated as final conclusions of effects of TGRs on storage carbohydrate. This study will be repeated in both the greenhouse and field.

### TGR effects on total nonstructural carbohydrate (TNC) of creeping bentgrass above ground tissue\* (Figure 1)



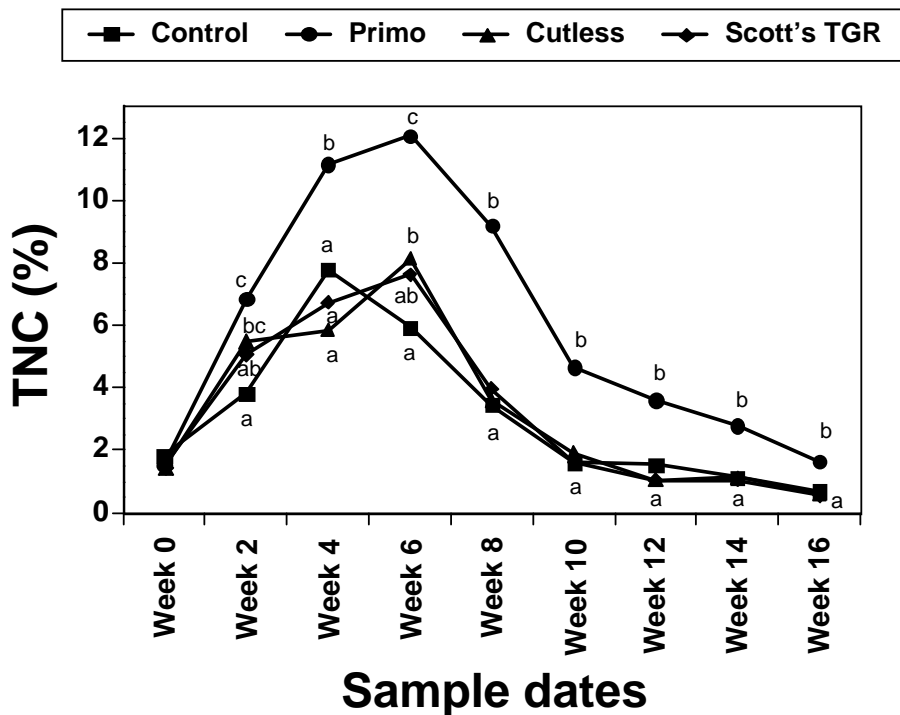
\* Average TNC across all application treatments.

## Effects of application intervals on TNC of creeping bentgrass above ground tissue\* (Figure 2)



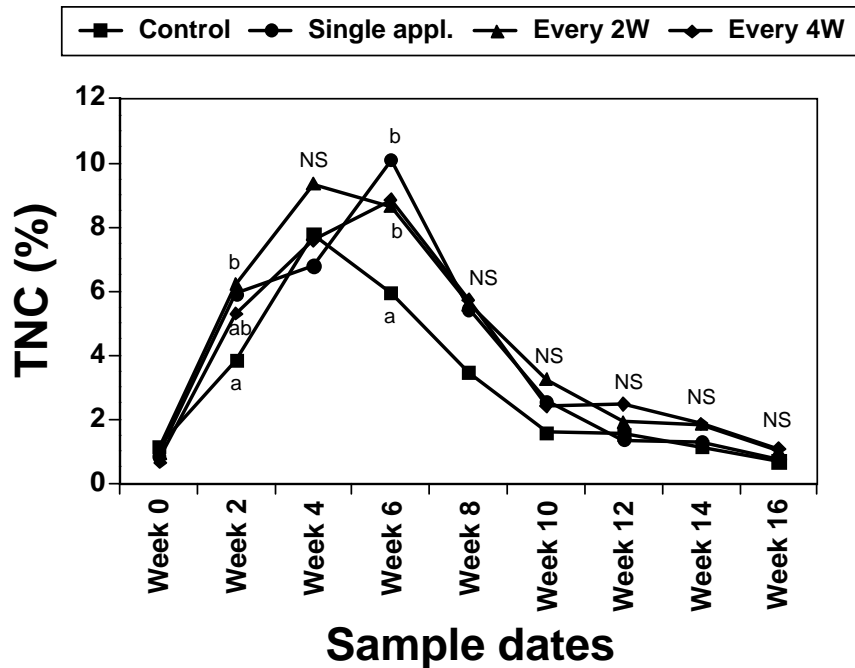
\* Average TNC across all TGR materials.

## TGR effects on total nonstructural carbohydrate (TNC) of creeping bentgrass roots\* (Figure 3)



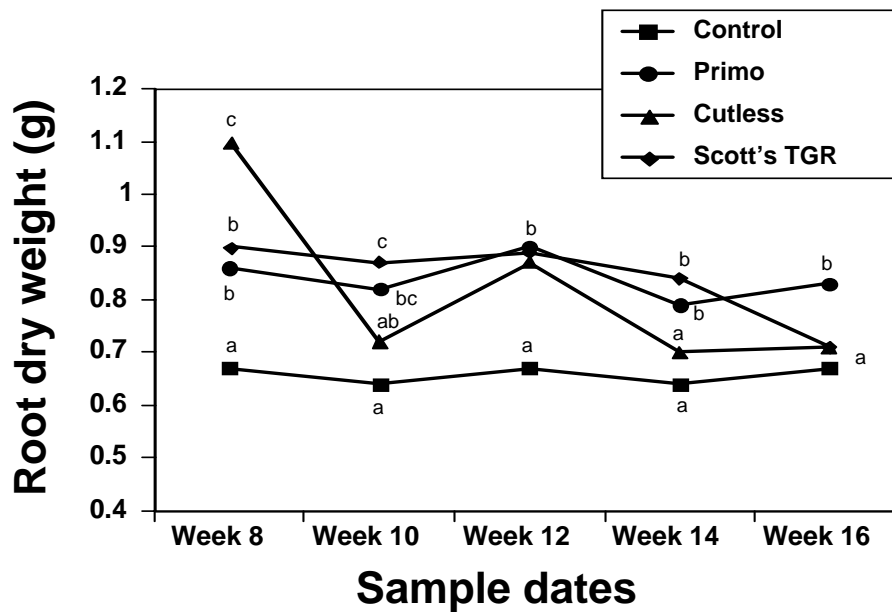
\* Average TNC across all application treatments.

## Effects of application intervals on TNC of creeping bentgrass roots\* (Figure 4)



\* Average TNC across all TGR materials.

## Creeping bentgrass root response to the application of growth retardants\* (Figure 5)



\* Average TNC across all application treatments.