

**MASSACHUSETTS
WEED SCIENCE RESEARCH RESULTS
2007**

VOLUME 26



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PREFACE

The purpose of this report is to inform cooperators in industry, colleagues at other institutions, and other persons interested in weed control, of the results of our research projects conducted in 2007. This information is our annual summary of ongoing field research in Weed Science at the University of Massachusetts, Amherst. Interpretation of the data may be modified by additional experiments. In spite of careful proofreading, there may be some typing or compilation errors in this report. Should you find an obvious error, please bring it to the attention of the author.

Information herein does not constitute a recommendation or endorsement of any product. Current recommendations for weed control in various crop commodities are available from the University of Massachusetts Extension.

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Prof. Prasanta C. Bhowmik
Amherst, MA
October 1, 2007

**MASSACHUSETTS
WEED SCIENCE RESEARCH RESULTS - 2007**

Weed management research in turfgrass and field crops at the University of Massachusetts is conducted by Prof. Prasanta C. Bhowmik. Other personnel in weed science research in 2007 were:

| | |
|------------------------------------|-------------------|
| Graduate Research Assistants | Nishanth Tharayil |
| | Saikat Ghosh |
| | Dipayan Sarkar |
| | Susan Cheplick |

Our field research program is partially funded by grant-in-aid support from industries. The following contributors are gratefully acknowledged for their support of our weed science projects in 2007.

Monsanto- The Agricultural Group
The Scotts Company
Syngenta Crop Protection

Appreciation is also extended to others who provided seeds, supplies, equipments, and/or services for these studies.

2007 RESEARCH PROJECTS

Field Research Projects

Use directions for herbicide treatments. Much of our field research is aimed at gaining information on various phases of herbicide application that will influence specific label directions for herbicide use on a given crop. This is extremely important to the user groups in Massachusetts for weed management under diverse ecological systems. Also, this information leads to Weed Control Recommendation Guides for all New England States.

Experimental herbicides and surfactants: New herbicides are being evaluated for their efficacy, turfgrass safety, and residual control of weeds under Massachusetts conditions. Herbicide formulations, additives, and antidotes have been included for various turfgrass studies.

Development of low maintenance strategies with growth regulators: Use of growth regulators along with various cultural practices may enhance our weed management practices in turfgrass areas, including golf courses. Spring and fall treatments of growth regulators have been examined for their effectiveness in *Poa annua* control in putting greens. Safety of these growth regulators is being examined carefully in relation to bentgrass growth and development over a period of several years.

Development of Growing Degree Day Model: We have initiated a joint research project between the Pennsylvania State University and University of Massachusetts. The main objective of this collaborative project is to develop a Growing Degree Day (GDD) Model by monitoring weed emergence patterns and by calculating growing degree-days (GDD) accumulation. Field data will be collected from four different locations.

TURFGRASS DATA COLLECTION METHODS

A. TURFGRASS

I. WEED CONTROL STUDIES. Visual ratings were estimated on weed control throughout the growing season based on a scale of 0 to 100%.

PERCENT WEED CONTROL: Zero percent control meaning the treatment did not affect the weeds in question and the weeds were still present, as in the untreated check plot. One 100% control meaning the treatment was effective and completely controlled the species in question.

WEED COUNTS: Weed counts represent the number of plants or shoots or tillers per unit area or per plot, based on randomly placed 400 cm² quadrats in each plot.

II. TOLERANCE STUDIES.

PERCENT TURF INJURY: Turfgrass injury was rated on a scale of 0 to 100%, 0% injury meaning no injury to the turfgrass, and 100% injury meaning the turfgrass is completely dead.

QUALITY AND COLOR. Visual ratings were estimated throughout the growing season. Turf quality and color were rated on a scale of 1 to 9. In our studies, a rating of 6 is commercially acceptable for both turf color and quality.

TURF QUALITY: Turf quality of 1 means dead turfgrass with bare ground, while 9 means a thick, lush stand of turfgrass.

TURF COLOR: Rating of 1 means dead turfgrass with brown color and bare ground, while 9 means a desirable turfgrass with dark green color.

III. GROWTH REGULATOR STUDIES. Various methods were used to determine the effectiveness of various growth regulator treatments.

1. Number of seed heads per unit area (cm² or in²)
2. Percent seed head reductions or suppression
3. Percent top growth reduction, (turf height measurement from clippings)
4. Clippings weight (fresh weight of clippings taken at 2 week intervals)

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Turfgrass

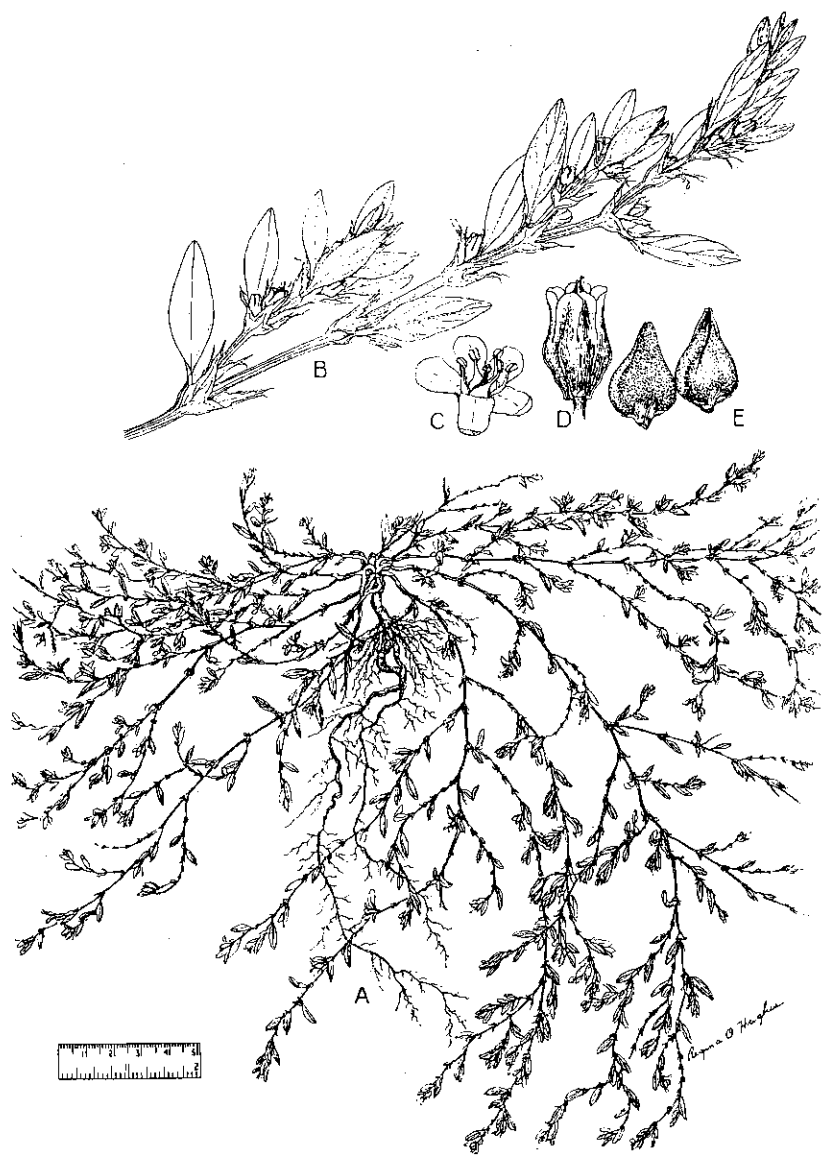
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Tracking Growing Degree Days for Crabgrass Phenology

Prasanta C. Bhowmik and Dipayan Sarkar
Department of Plant, Soil, and Insect Sciences
University of Massachusetts – Amherst

Phenology is the study of the response of living organisms to seasonal and climatic changes to the environment in which they live. Seasonal changes include variations in the duration of sunlight, precipitation, temperature and other life-controlling factors. Germination of crabgrass, blooming forsythia, migrating birds, flashing fireflies, falling leaves, birth and death are all part of the cycles of life that we experience each year.

Phenological records help alert us about the events of nature and provide interesting comparisons between years and among different geographic regions. These records also have scientific value for understanding the interactions between organisms and their environment and for designing management decisions. And these records could also be used to develop models to predict such events.

Developmental stages

Each stage of plant's development has its own total heat requirement. Developmental stages such as germination, seedling stage, tiller stage, flowering stage, mature stage, and senescence stage can be estimated by tracking accumulating degree-days between temperature thresholds throughout the season. The accumulation of degree-days from a starting point can help predict when a specific developmental stage will be reached. Degree-day monitoring does not indicate whether control action is warranted, but rather when a pest will reach susceptible life stages. Monitoring degree-days helps to eliminate the guesswork of making management decisions.

Developmental thresholds

Two parameters are used when referring to the effect of temperature on growth and development of plants. The **lower developmental threshold** for a species is the temperature below which development stop. The **upper developmental threshold** is less well defined, but is often taken as the temperature at which the rate of growth or development begins to decrease.

Physiological time

The amount of heat needed by a plant or an organism to develop is known as physiological time. The amount of heat required to complete a given plant's development does not vary—the combination of temperature (between thresholds) and time will always be the same. **Physiological time is often expressed in units called degree-days.** For instance: if a species has a lower developmental threshold of 55° F, and the temperature remains at 56° F (or 1

degree above the lower developmental threshold) for 24 hours, one degree-day is accumulated.

What is a phenology model?

Phenology models predict time of events in an organism's development. Development of many organisms which cannot internally regulate their own temperature is dependent on temperatures to which they are exposed in the environment. Plants require a certain amount of heat to develop from one point in their life-cycle to another, e.g., from seeds to seedlings, and to mature plants. Because of yearly variations in weather, calendar dates are not a good basis for making management decisions. Measuring the amount of heat accumulated over time provides a physiological time scale that is biologically more accurate than calendar days.

2007 Study

0701TG1

This study was repeated in 2007 at South Deerfield, MA. A preemergence herbicide, prodiamine (Barricade 65 WDG), was used for this experiment. Based on the previous year's crabgrass emergence and total accumulated GDD, treatments were applied at the following calendar dates in 2007.

March 15
March 30
April 15
April 30
May 15
May 30

Crabgrass emergence and growth were monitored over the growing season. Also, all environmental data were collected as the previous year.

These experiments were also conducted at the Penn State University in 2006 and 2007. Calculation of growing degree day (GDD) information will be generated based on all environmental and experimental data from these two/three locations.

2006 Study

0653TG3

In 2006, this study was initiated at the Joseph Troll Turf Research Center, South Deerfield, MA. Crabgrass emergence was monitored during the growing season.

Weather data were acquired from SkyBit (a weather-data-company) on a daily basis. Based on growing degree days, each treatment was applied on the following calendar dates in 2006.

March 30
April 4
April 6
April 11
April 14
April 17
April 20
April 25

How is GDD calculated?

First, growing degree day (GDD) accumulation is the sum of the numbers of degrees by which each day's average temperature (maximum and minimum) exceeds a base temperature. For most plants and organisms, the base temperature is 50° F. **For example: if the average daily air temperature on March 28th was 56° F, the growing degree day (GDD) would be 6° F and the total accumulated GDD would be 22 (Table 1).** Each day, the GDD numbers are added together to give a total accumulative GDD figure. Negative growing degree days are considered to be zero (see April 5, Table 1).

Our calculations are based on surface temperature degree days (SFTAL), using Allen Method. Weather data (via satellite) has been provided by SkyBit, Weather-Data Company.

Table 1. Observed degree-days and total accumulated growing degree-days (GDD) in 2006, Amherst, Hampshire County, Massachusetts

| Calendar Dates | SFTAL (Observed degree-days) | |
|-----------------|------------------------------|-------------------------------------|
| | Daily degree-days | Total accumulated degree-days (GDD) |
| March 15 | 0 | 0 |
| March 16 | 0 | 0 |
| March 17 | 0 | 0 |
| March 18 | 0 | 0 |
| March 19 | 0 | 0 |
| March 20 | 0 | 0 |
| March 21 | 1 | 1 |
| March 22 | 1 | 2 |
| March 23 | 3 | 5 |
| March 24 | 4 | 9 |
| March 25 | 1 | 10 |
| March 26 | 2 | 12 |
| March 27 | 4 | 16 |
| March 28 | 6 | 22 |
| March 29 | 8 | 30 |
| March 30 | 12 | 42 |
| March 31 | 14 | 56 |
| April 01 | 16 | 72 |
| April 02 | 11 | 83 |
| April 03 | 7 | 90 |
| April 04 | 4 | 94 |
| April 05 | 0 | 94 |
| April 06 | 2 | 96 |
| April 07 | 5 | 101 |
| April 08 | 5 | 106 |
| April 09 | 4 | 110 |
| April 10 | 8 | 118 |
| April 11 | 11 | 129 |
| April 12 | 14 | 143 |
| April 13 | 15 | 158 |
| April 14 | 15 | 173 |
| April 15 | 17 | 190 |
| April 16 | 14 | 204 |
| April 17 | 6 | 210 |
| April 18 | 10 | 220 |
| April 19 | 15 | 235 |
| April 20 | 16 | 251 |
| April 21 | 15 | 266 |
| April 22 | 6 | 272 |
| April 23 | 2 | 274 |
| April 24 | 3 | 277 |
| April 25 | 7 | 284 |
| April 26 | 10 | 294 |
| April 27 | 10 | 304 |
| April 28 | 11 | 315 |
| April 29 | 9 | 324 |
| April 30 | 12 | 336 |

Weeds will continue to germinate and emerge for several weeks after initial emergence is observed. Peak germination of crabgrass in Massachusetts occurs around 300-450 growing degree days (GDD) and some germination may continue thereafter. Therefore, preemergence herbicides applied after the initial germination period will still provide a significant benefit in preventing additional crabgrass emergence.

In summary, by monitoring weed emergence patterns and by calculating growing degree-days (GDD) accumulation, GDD models could be developed. Turfgrass managers can use the information from GDD models as a guide for targeting preemergence (residual) herbicide applications in a region. It is important to know that biological processes don't suddenly turn on when a specific degree-day total is reached but they occur within a range of degree days. For example, crabgrass (*Digitaria* species) germinates within a degree-day range of 42-80.



Carbohydrate Partitioning of Creeping Bentgrass as Influenced by Nitrogen Fertilization and Growth Retardant

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University of Massachusetts-Amherst

The total nonstructural carbohydrate level of turfgrass has been considered a potential indirect indicator of the physiological status or the recovering capability of turfgrass after the stressful effects on turfgrass have been relieved. The effect of various management practices on plant vigor can be measured quantitatively through the quantity of nonstructural carbohydrate content. The major total nonstructural carbohydrate found in turfgrass shoots consist of the monosaccharides, glucose and fructose, the disaccharide sucrose, various oligosaccharides of the β -2 \rightarrow 6-linked polyfructosylsucrose type, starch, and long-chain fructans. Some C_3 grasses accumulate starch or sucrose in their stem bases, but most cool-season turfgrasses concentrate fructans in their vegetative tissues.

The total nonstructural carbohydrate content has been measured as an indicator of growth and physiological responses of creeping bentgrass to increasing temperatures and heat-stress conditions (Huang and Gao 2000; Xu and Huang 2000). The total nonstructural carbohydrate is also useful for evaluating the effects of different cultural practices on disease incidence and severity of turfgrasses (Davis and Dernoeden 1991). Seasonal variations of nonstructural carbohydrates in turfgrass roots and shoots dictate their performance under stress conditions.

Effects of nitrogen fertilization

Nitrogen is the mineral nutrient required in greatest quantities by turfgrass. It is an essential component of chlorophyll, amino acids, proteins, nucleic acids, enzymes and other plant substances. Nitrogen content in turfgrass shoots ranges from 2 to 4%. Adequate nitrogen nutrition is necessary for healthy growth. Excessive application of nitrogen, however, can result in excessive aerial shoot growth, poor root and lateral shoot growth, higher disease incidence, reduced carbohydrate reserves, poor tolerance to heat, cold, drought, traffic, and other environmental stresses. An old rule thumb has been to 'keep the grass a little on the hungry side'. As shoot growth increases after nitrogen application, carbohydrates are utilized and reserves are reduced. Reduction in carbohydrate level following nitrogen application may be an important factor as they relate to heat tolerance in cool-season turfgrasses, and freezing tolerance in warm-season turfgrasses. Both stresses cause more injury on carbohydrate depleted turfgrass (Fry and Huang 2004; Bhowmik *et al.*, 2007). Recent literature indicates

stress tolerance of turfgrass species and other plants may be related to antioxidant activity.

Effects of growth retardant (Trinexapac-ethyl)

In recent years, plant growth regulators (PGR) have been used regularly as an important management tool of turfgrass. Although originally introduced to reduce mowing, and suppress seed head development, PGRs also affect turfgrass population dynamics and improve the tolerance of turfgrass to abiotic stresses. Trinexapac-ethyl, a gibberellic acid inhibitor, has been the most widely accepted product for preparing turfgrasses under various types of stress. Limited studies reported increased levels of total soluble carbohydrates in creeping bentgrass following applications of trinexapac-ethyl, although their increase were transient and were only observed for 4 to 5 weeks. The increased soluble carbohydrates observed in trinexapac-ethyl treated grasses suggest that turfgrass would be better able to withstand desiccation related stresses such as drought, salinity and freezing. In addition, turfgrass treated with trinexapac-ethyl may also have a greater partitioning of carbohydrate from leaves to structures such as roots, rhizomes or stolons.

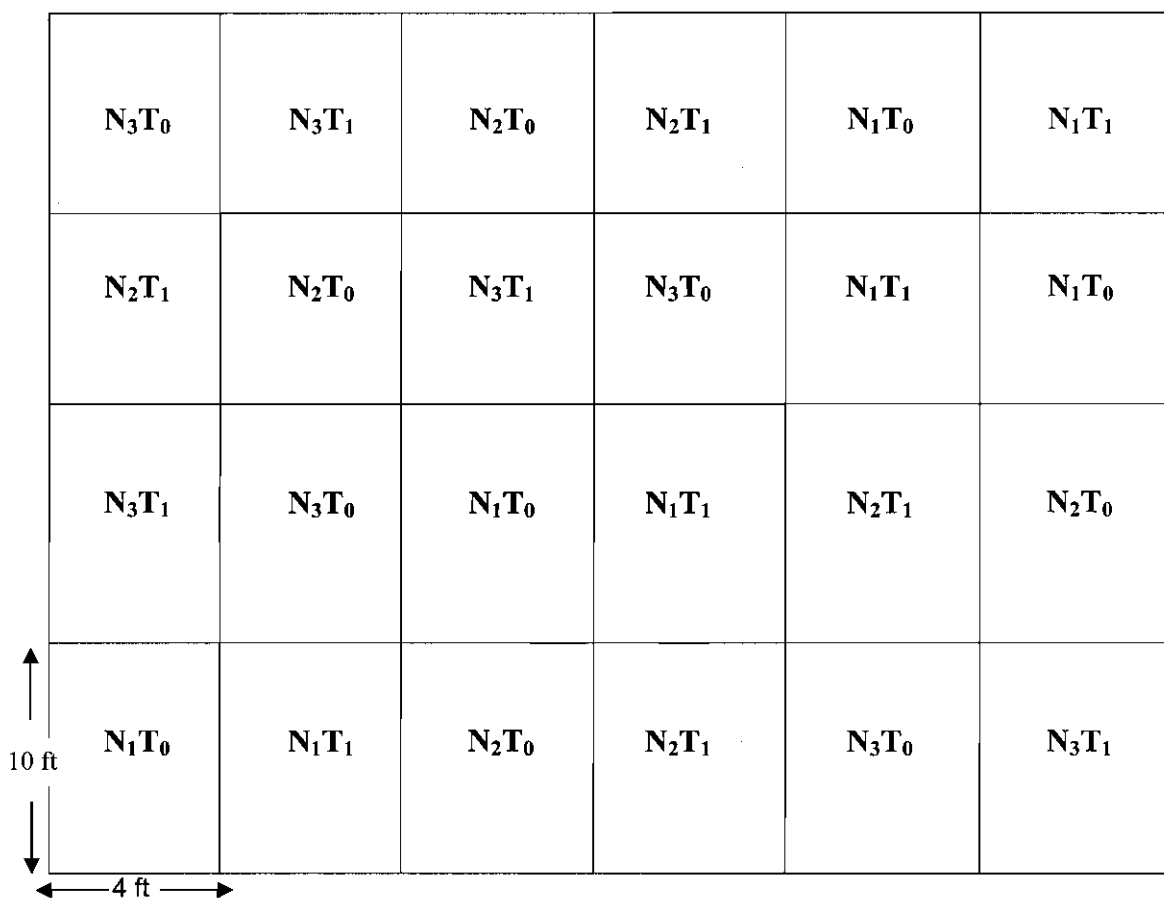
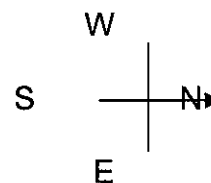
Objectives

Turfgrass maintained on golf course greens are subjected to intensive management practices. These harsh conditions may jeopardize carbohydrate availability to the turfgrass during critical growth periods, thus making them vulnerable to other cultural and environmental stresses. In the past, significant differences in total nonstructural carbohydrate content were observed in turfgrass under different management practices. Nitrogen fertilization plays one of the most crucial roles in these practices. Although, nitrogen has a significant influence on total nonstructural carbohydrate distribution in creeping bentgrass, limited information is available under putting green conditions. Although, growth retardant is commonly used on golf course greens, and claiming a useful role under stress situation, but the physiological and biochemical mechanisms of this growth retardant is not clearly understood in creeping bentgrass. Therefore, it is important to investigate possible mechanisms of trinexapac-ethyl on carbohydrate partitioning in creeping bentgrass. Our research will provide information on physiological mechanisms of carbohydrate partitioning and antioxidant activity in relation to nitrogen fertilization and trinexapac-ethyl on creeping bentgrass under putting green.

The experiment was initiated in the fall of 2005 and nitrogen fertilization was initiated in the spring of 2006. This experiment was laid out in a split-plot design, having nitrogen fertilization as the main plot and growth retardant as sub-plot with four replications. This study will be repeated in 2008.

0702TG2

**EXPERIMENT PLOT LAY OUT
(South Deerfield, MA)**



Treatments

Main plot - Nitrogen

N_1 = 3 lb N/1000 sq. ft/ year
 N_2 = 5 lb N/1000 sq. ft/ year
 N_3 = 8 lb N/1000 sq. ft/ year

Fertilizer 19-3-19 (N-P-K)

N_1 = 47.73 g/M/plot
 N_2 = 79.52 g/M/plot
 N_3 = 127.31 g/M/plot

Sub plot – Trinexapac-ethyl

T_0 = Without Trinexapac-ethyl
 T_1 = With Trinexapac-ethyl

T_1 = 0.125 fl. OZ/ 1000 sq ft.
 0.444 ml PRIMO MAXX/ 120 sq ft.
 521 ml water/ 120 sq ft. (1 REP)

References

- Davis, D. B., and Dernoeden, P. H. 1991. Summer patch and Kentucky bluegrass as influenced by cultural practices. *Agron. J.* 83:670-677.
- Fry, J. and B. Huang. 2004. *Applied turfgrass science and physiology*. John Wiley & Sons, Inc. Hoboken, NJ.
- Huang, B., and Gao, H. 2000. Growth and carbohydrate metabolism of creeping bentgrass cultivars in response to increasing temperatures. *Crop Sci.* 40:1115-1120.
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UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3 Investigator: Prasanta C Bhowmik
 Location: Study Dir.: PRASANTA C. BHOWMIK

GENERAL TRIAL INFORMATION

Study Director: P.C.Bhowmik **Title:** Prof.
Affiliation: Univ. of Massachusetts **Postal Code:** _____

Other Investigator: D. SARKAR & N. THARAYIL **Title:** _____
Affiliation: Univ. of Massachusetts **Postal Code:** _____

Trial Status: _____ **Initiation Date:** _____ **Country:** _____
City: _____ **State/Prov.:** _____ **Postal Code:** _____

Plot Width, Unit: 3.5 FT **Plot Length, Unit:** 10 FT **Reps:** 4
Site Type: _____
Tillage Type: _____ **Study Design:** RANDOMIZED COMPLETE BLOCK
Field Prep./Maintenance: low maintenance
Trial Initiation Comments: Established turfgrass area

| Previous: Crops | Pesticides | Year |
|-----------------|------------|-------|
| 1. _____ | _____ | _____ |
| 2. _____ | _____ | _____ |
| 3. _____ | _____ | _____ |

APPLICATION DESCRIPTION

| | A | B | C | D | E | F |
|-----------------------------|-----------|--------|-------|-------|-------|-------|
| Application Date: | Jul-06-07 | _____ | _____ | _____ | _____ | _____ |
| Time of Day: | 11.00 am | _____ | _____ | _____ | _____ | _____ |
| Application Method: | CO2 | _____ | _____ | _____ | _____ | _____ |
| Application Timing: | POST | _____ | _____ | _____ | _____ | _____ |
| Applic. Placement: | _____ | _____ | _____ | _____ | _____ | _____ |
| Air Temp., Unit: | 82.4 F | _____ | _____ | _____ | _____ | _____ |
| % Relative Humidity: | 35 | _____ | _____ | _____ | _____ | _____ |
| Wind Velocity, Unit: | 2 MPH | _____ | _____ | _____ | _____ | _____ |
| Dew Presence (Y/N): | - | _____ | _____ | _____ | _____ | _____ |
| Water Hardness: | _____ | _____ | _____ | _____ | _____ | _____ |
| Soil Temp., Unit: | 78.8 F | 74.4 F | _____ | _____ | _____ | _____ |
| Soil Moisture: | @0.5" | @ 2.0" | _____ | _____ | _____ | _____ |
| % Cloud Cover: | 5 | _____ | _____ | _____ | _____ | _____ |

UNIVERSITY OF MASSACHUSETTS-AMHERST

| | | APPLICATION EQUIPMENT | | | | | |
|-----------------------|-----------|-----------------------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E | F |
| Appl. Equipment: | BACKPACK | _____ | _____ | _____ | _____ | _____ | _____ |
| Operating Pressure: | 22 PSI | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Type: | TEEJET | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Size: | 110004 VS | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Spacing, Unit: | 20 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzles/Row: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Band Width, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Boom Length, Unit: | 20 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Boom Height, Unit: | 17 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Ground Speed, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Incorporation Equip.: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Hours to Incorp.: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Incorp. Depth, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Carrier: | WATER | _____ | _____ | _____ | _____ | _____ | _____ |
| Spray Volume, Unit: | 50 GPA | _____ | _____ | _____ | _____ | _____ | _____ |
| Spray pH: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Propellant: | CO2 | _____ | _____ | _____ | _____ | _____ | _____ |
| Tank Mix (Y/N): | _____ | _____ | _____ | _____ | _____ | _____ | _____ |

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3
 Location:

Investigator: Prasanta C Bhowmik
 Study Dir.: PRASANTA C. BHOWMIK

| Weed Code | | | | | | | POAPR | POAPR | POAPR | |
|--------------------|-------------------|----------|-------|------|-----------|----------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | | | CONTROL | CONTROL | CONTROL | |
| Rating Unit | | | | | | | PERCENT | PERCENT | PERCENT | |
| Rating Date | | | | | | | Jul-07-07 | Jul-09-07 | Jul-13-07 | |
| Trt-Eval Interval | | | | | | | 1 DA-A | 3 DA-A | 7 DA-A | |
| Trt No. | Treatment Name | Form Amt | Fm Ds | Rate | Grow Unit | Appl Stg | Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 LB | A/A | POST | A | 8.8 ab | 35.0 a | 89.5 a |
| 2 | Roundup PRO | 65 | WG | 4 LB | A/A | POST | A | 7.5 ab | 32.5 a | 95.0 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 | QT/A | POST | A | 15.0 a | 30.0 a | 92.5 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 | QT/A | POST | A | 11.3 ab | 35.0 a | 95.0 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 | QT/A | POST | A | 13.8 a | 37.5 a | 86.3 a |
| 6 | MON 76207 | | SL | 2.67 | QT/A | POST | A | 15.0 a | 30.0 a | 96.5 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 | QT/A | POST | A | 11.3 ab | 30.0 a | 91.3 a |
| 8 | MON 76302 | | SL | 2.67 | QT/A | POST | A | 10.0 ab | 36.3 a | 88.8 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | | A | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | 8.17 | 8.74 | 7.83 | |
| Standard Deviation | | | | | | | 5.60 | 5.99 | 5.36 | |
| CV | | | | | | | 54.49 | 20.25 | 6.57 | |
| Bartlett's X2 | | | | | | | 7.561 | 7.481 | 14.369 | |
| P(Bartlett's X2) | | | | | | | 0.373 | 0.187 | 0.045* | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3
 Location:

Investigator: Prasanta C Bhowmik
 Study Dir.: PRASANTA C. BHOWMIK

| Weed Code | | | | | | | POAPR | POAPR | POAPR |
|--------------------|-------------------|----------|-------|-----------|----------|-----------|-----------|-----------|-----------|
| Rating Data Type | | | | | | | CONTROL | CONTROL | CONTROL |
| Rating Unit | | | | | | | PERCENT | PERCENT | PERCENT |
| Rating Date | | | | | | | Jul-24-07 | Aug-15-07 | Sep-14-07 |
| Trt-Eval Interval | | | | | | | 18 DA-A | 40 DA-A | 70 DA-A |
| Trt No. | Treatment Name | Form Amt | Fm Ds | Rate Unit | Grow Stg | Appl Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 LB A/A | POST | A | 96.3 a | 95.8 a | 91.3 a |
| 2 | Roundup PRO | 65 | WG | 4 LB A/A | POST | A | 97.8 a | 96.0 a | 92.0 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 QT/A | POST | A | 96.3 a | 95.8 a | 87.5 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 QT/A | POST | A | 99.5 a | 97.0 a | 86.3 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 QT/A | POST | A | 97.0 a | 95.8 a | 83.8 a |
| 6 | MON 76207 | | SL | 2.67 QT/A | POST | A | 98.8 a | 94.5 a | 82.5 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 QT/A | POST | A | 96.3 a | 96.3 a | 85.0 a |
| 8 | MON 76302 | | SL | 2.67 QT/A | POST | A | 99.5 a | 99.5 a | 91.3 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | A | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | 3.16 | 4.97 | 8.23 |
| Standard Deviation | | | | | | | 2.17 | 3.40 | 5.64 |
| CV | | | | | | | 2.49 | 3.97 | 7.26 |
| Bartlett's X2 | | | | | | | 9.284 | 8.521 | 1.531 |
| P(Bartlett's X2) | | | | | | | 0.233 | 0.289 | 0.981 |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3
 Location:

Investigator: Prasanta C Bhowmik
 Study Dir.: PRASANTA C. BHOWMIK

| Weed Code | | | | | | | DIGSA | DIGSA | DIGSA | |
|--------------------|-------------------|----------|-------|------|-----------|----------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | | | CONTROL | CONTROL | CONTROL | |
| Rating Unit | | | | | | | PERCENT | PERCENT | PERCENT | |
| Rating Date | | | | | | | Jul-07-07 | Jul-09-07 | Jul-13-07 | |
| Trt-Eval Interval | | | | | | | 1 DA-A | 3 DA-A | 7 DA-A | |
| Trt No. | Treatment Name | Form Amt | Fm Ds | Rate | Grow Unit | Appl Stg | Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 LB | A/A | POST | A | 40.0 ab | 71.3 a | 98.0 a |
| 2 | Roundup PRO | 65 | WG | 4 LB | A/A | POST | A | 45.0 ab | 73.8 a | 97.8 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 | QT/A | POST | A | 51.3 ab | 75.0 a | 97.3 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 | QT/A | POST | A | 62.5 a | 75.0 a | 98.3 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 | QT/A | POST | A | 50.0 ab | 73.8 a | 97.0 a |
| 6 | MON 76207 | | SL | 2.67 | QT/A | POST | A | 25.0 b | 66.3 a | 99.0 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 | QT/A | POST | A | 35.0 ab | 76.3 a | 97.7 a |
| 8 | MON 76302 | | SL | 2.67 | QT/A | POST | A | 27.5 b | 73.8 a | 98.7 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | | A | 0.0 c | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | 18.64 | 11.80 | 2.62 | |
| Standard Deviation | | | | | | | 12.77 | 8.08 | 1.79 | |
| CV | | | | | | | 34.19 | 12.44 | 2.05 | |
| Bartlett's X2 | | | | | | | 8.766 | 10.23 | 2.997 | |
| P(Bartlett's X2) | | | | | | | 0.27 | 0.176 | 0.809 | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3
 Location:

Investigator: Prasanta C Bhowmik
 Study Dir.: PRASANTA C. BHOWMIK

| Weed Code | | | | | | DIGSA | DIGSA | DIGSA | |
|--------------------|-------------------|----------|-------|-----------|----------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | | CONTROL | CONTROL | CONTROL | |
| Rating Unit | | | | | | PERCENT | PERCENT | PERCENT | |
| Rating Date | | | | | | Jul-24-07 | Aug-15-07 | Sep-14-07 | |
| Trt-Eval Interval | | | | | | 18 DA-A | 40 DA-A | 70 DA-A | |
| Trt No. | Treatment Name | Form Amt | Fm Ds | Rate Unit | Grow Stg | Appl Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 LB A/A | POST | A | 97.5 a | 88.8 a | 72.5 a |
| 2 | Roundup PRO | 65 | WG | 4 LB A/A | POST | A | 99.5 a | 88.8 a | 67.5 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 QT/A | POST | A | 99.5 a | 90.0 a | 67.5 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 QT/A | POST | A | 99.5 a | 86.3 a | 77.5 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 QT/A | POST | A | 96.3 a | 87.5 a | 73.8 a |
| 6 | MON 76207 | | SL | 2.67 QT/A | POST | A | 97.0 a | 82.5 a | 68.8 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 QT/A | POST | A | 98.2 a | 89.1 a | 76.3 a |
| 8 | MON 76302 | | SL | 2.67 QT/A | POST | A | 99.5 a | 92.4 a | 77.5 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | A | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | 2.39 | 9.57 | 12.51 |
| Standard Deviation | | | | | | | 1.63 | 6.53 | 8.57 |
| CV | | | | | | | 1.87 | 8.33 | 13.27 |
| Bartlett's X2 | | | | | | | 7.673 | 5.691 | 4.404 |
| P(Bartlett's X2) | | | | | | | 0.362 | 0.576 | 0.732 |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3
 Location:

Investigator: Prasanta C Bhowmik
 Study Dir.: PRASANTA C. BHOWMIK

| Weed Code | | | | | | | | TRFRE | TRFRE | TRFRE |
|--------------------|-------------------|----------|-------|-----------|-----------|----------|-----------|-----------|-----------|-----------|
| Rating Data Type | | | | | | | | CONTROL | CONTROL | CONTROL |
| Rating Unit | | | | | | | | PERCENT | PERCENT | PERCENT |
| Rating Date | | | | | | | | Jul-07-07 | Jul-09-07 | Jul-13-07 |
| Trt-Eval Interval | | | | | | | | 1 DA-A | 3 DA-A | 7 DA-A |
| Trt No. | Treatment Name | Form Amt | Fm Ds | Rate Rate | Unit Unit | Grow Stg | Appl Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 | LB A/A | POST | A | 51.3 a | 82.5 a | 96.5 a |
| 2 | Roundup PRO | 65 | WG | 4 | LB A/A | POST | A | 47.5 a | 75.0 a | 96.3 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 | QT/A | POST | A | 35.0 a | 60.0 a | 92.5 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 | QT/A | POST | A | 50.0 a | 81.3 a | 95.8 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 | QT/A | POST | A | 50.0 a | 78.8 a | 94.0 a |
| 6 | MON 76207 | | SL | 2.67 | QT/A | POST | A | 65.0 a | 72.5 a | 99.0 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 | QT/A | POST | A | 42.5 a | 66.3 a | 93.3 a |
| 8 | MON 76302 | | SL | 2.67 | QT/A | POST | A | 51.3 a | 76.3 a | 95.8 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | | A | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | | 19.21 | 15.17 | 5.34 |
| Standard Deviation | | | | | | | | 13.16 | 10.40 | 3.66 |
| CV | | | | | | | | 30.18 | 15.79 | 4.32 |
| Bartlett's X2 | | | | | | | | 4.344 | 22.732 | 10.73 |
| P(Bartlett's X2) | | | | | | | | 0.739 | 0.002* | 0.151 |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3

Investigator: Prasanta C Bhowmik

Location:

Study Dir.: PRASANTA C. BHOWMIK

| Weed Code | | | | | | | TRFRE | TRFRE | TRFRE | |
|--------------------|-------------------|------|----|------|--------|------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | | | CONTROL | CONTROL | CONTROL | |
| Rating Unit | | | | | | | PERCENT | PERCENT | PERCENT | |
| Rating Date | | | | | | | Jul-24-07 | Aug-15-07 | Sep-14-07 | |
| Trt-Eval Interval | | | | | | | 18 DA-A | 40 DA-A | 70 DA-A | |
| Trt | Treatment | Form | Fm | Rate | Grow | Appl | | | | |
| No. | Name | Amt | Ds | Rate | Unit | Stg | Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 | LB A/A | POST | A | 93.8 a | 98.3 a | 78.8 a |
| 2 | Roundup PRO | 65 | WG | 4 | LB A/A | POST | A | 99.5 a | 97.8 a | 77.5 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 | QT/A | POST | A | 93.3 a | 92.0 a | 73.8 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 | QT/A | POST | A | 99.0 a | 95.0 a | 80.0 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 | QT/A | POST | A | 93.8 a | 94.5 a | 80.0 a |
| 6 | MON 76207 | | SL | 2.67 | QT/A | POST | A | 98.5 a | 97.8 a | 77.5 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 | QT/A | POST | A | 90.8 a | 91.3 a | 77.5 a |
| 8 | MON 76302 | | SL | 2.67 | QT/A | POST | A | 97.3 a | 99.5 a | 80.0 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | | A | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | 6.40 | 5.55 | 9.30 | |
| Standard Deviation | | | | | | | 4.39 | 3.81 | 6.37 | |
| CV | | | | | | | 5.16 | 4.47 | 9.17 | |
| Bartlett's X2 | | | | | | | 25.458 | 15.508 | 2.244 | |
| P(Bartlett's X2) | | | | | | | 0.001* | 0.03* | 0.896 | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3
 Location:

Investigator: Prasanta C Bhowmik
 Study Dir.: PRASANTA C. BHOWMIK

| | | | | | | | TAROF CONTROL PERCENT Jul-07-07 1 DA-A | TAROF CONTROL PERCENT Jul-09-07 3 DA-A | TAROF CONTROL PERCENT Jul-13-07 7 DA-A | |
|--------------------|-------------------|-------------|----------|--------------|--------------|-------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|--------|
| Trt No. | Treatment Name | Form Amt | Fm Ds | Rate Rate | Grow Unit | Appl Stg | Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 | LB A/A | POST | A | 30.0 a | 47.5 a | 53.8 a |
| 2 | Roundup PRO | 65 | WG | 4 | LB A/A | POST | A | 31.3 a | 47.5 a | 60.0 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 | QT/A | POST | A | 32.5 a | 50.0 a | 60.0 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 | QT/A | POST | A | 32.5 a | 52.5 a | 65.0 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 | QT/A | POST | A | 30.0 a | 48.8 a | 70.0 a |
| 6 | MON 76207 | | SL | 2.67 | QT/A | POST | A | 32.4 a | 54.2 a | 76.2 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 | QT/A | POST | A | 49.1 a | 65.9 a | 76.2 a |
| 8 | MON 76302 | | SL | 2.67 | QT/A | POST | A | 37.5 a | 50.0 a | 70.0 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | | A | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | | 16.59 | 17.29 | 15.78 |
| Standard Deviation | | | | | | | | 11.31 | 11.79 | 10.76 |
| CV | | | | | | | | 36.97 | 25.49 | 18.23 |
| Bartlett's X2 | | | | | | | | 5.092 | 4.051 | 7.509 |
| P(Bartlett's X2) | | | | | | | | 0.649 | 0.774 | 0.378 |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Evaluation of Glyphosate Formulations-White clover

Trial ID: 0703TG3

Investigator: Prasanta C Bhowmik

Location:

Study Dir.: PRASANTA C. BHOWMIK

| Weed Code | | | | | | | TAROF | TAROF | TAROF | |
|--------------------|-------------------|----------|-------|-----------|-----------|----------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | | | CONTROL | CONTROL | CONTROL | |
| Rating Unit | | | | | | | PERCENT | PERCENT | PERCENT | |
| Rating Date | | | | | | | Jul-24-07 | Aug-15-07 | Sep-14-07 | |
| Trt-Eval Interval | | | | | | | 18 DA-A | 40 DA-A | 70 DA-A | |
| Trt No. | Treatment Name | Form Amt | Fm Ds | Rate Rate | Unit Unit | Grow Stg | Appl Code | | | |
| 1 | Roundup PRO | 65 | WG | 2 | LB A/A | POST | A | 81.3 a | 92.0 a | 67.5 a |
| 2 | Roundup PRO | 65 | WG | 4 | LB A/A | POST | A | 95.0 a | 94.5 a | 65.0 a |
| 3 | MON 78270 | 4.5 | SL | 1.33 | QT/A | POST | A | 83.8 a | 91.3 a | 65.0 a |
| 4 | MON 78270 | 4.5 | SL | 2.67 | QT/A | POST | A | 90.0 a | 95.0 a | 65.0 a |
| 5 | MON 76207 (39.3%) | | SL | 1.33 | QT/A | POST | A | 83.8 a | 94.5 a | 65.0 a |
| 6 | MON 76207 | | SL | 2.67 | QT/A | POST | A | 95.0 a | 94.2 a | 67.5 a |
| 7 | MON 76302 (39.6%) | | SL | 1.33 | QT/A | POST | A | 92.3 a | 92.5 a | 62.5 a |
| 8 | MON 76302 | | SL | 2.67 | QT/A | POST | A | 92.5 a | 98.5 a | 65.0 a |
| 9 | UNTREATED CHECK | 0 | O | 0 | | | A | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | | 13.30 | 5.44 | 12.10 | |
| Standard Deviation | | | | | | | 9.07 | 3.71 | 8.29 | |
| CV | | | | | | | 11.44 | 4.44 | 14.28 | |
| Bartlett's X2 | | | | | | | 4.418 | 7.309 | 6.167 | |
| P(Bartlett's X2) | | | | | | | 0.731 | 0.397 | 0.52 | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

| | | APPLICATION EQUIPMENT | | | | | |
|-----------------------|-----------|-----------------------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E | F |
| Appl. Equipment: | BACKPACK | _____ | _____ | _____ | _____ | _____ | _____ |
| Operating Pressure: | 22 PSI | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Type: | TEEJET | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Size: | 110004 VS | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Spacing, Unit: | 20 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzles/Row: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Band Width, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Boom Length, Unit: | 20 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Boom Height, Unit: | 17 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Ground Speed, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Incorporation Equip.: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Hours to Incorp.: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Incorp. Depth, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Carrier: | WATER | _____ | _____ | _____ | _____ | _____ | _____ |
| Spray Volume, Unit: | 50 GPA | _____ | _____ | _____ | _____ | _____ | _____ |
| Spray pH: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Propellant: | CO2 | _____ | _____ | _____ | _____ | _____ | _____ |
| Tank Mix (Y/N): | - | - | - | - | - | - | - |

UNIVERSITY OF MASSACHUSETTS-AMHERST

Tolerance of Kentucky bluegrass to various treatments

Trial ID: 0705TG5
 Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
 Investigator: PRASANTA C. BHOWMIK

| Crop Code | | | | | | POAPR | POAPR | POAPR | POAPR | | |
|--------------------|------------------------------------------------------|-----------|-----------|-------|-----------|-----------|-----------|-----------|-----------|--------|--------|
| Rating Data Type | | | | | | Quality | Quality | Quality | Quality | | |
| Rating Unit | | | | | | 1-9 | 1-9 | 1-9 | 1-9 | | |
| Rating Date | | | | | | Jun-22-07 | Jul-07-07 | Jul-24-07 | Aug-15-07 | | |
| Trt-Eval Interval | | | | | | 7 DA-A | 22 DA-A | 39 DA-A | 61 DA-A | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Grow Unit | Appl Stg | Code | | | | |
| 1 | A15879 | 476 | SC | 1 | LB A/A | POSPRE | A | 8.00 a-d | 7.63 b | 8.38 a | 8.38 a |
| 2 | A15879 | 476 | SC | 2 | LB A/A | POSPRE | A | 8.00 a-d | 7.75 b | 8.50 a | 8.50 a |
| 3 | A12738 BARRICADE 4 FL | 480 | SC | 0.25 | LB A/A | POSPRE | A | 7.75 bcd | 7.75 b | 8.38 a | 8.38 a |
| | | 480 | SC | 0.75 | LB A/A | POSPRE | A | | | | |
| 4 | A12738 BARRICADE 4 FL | 480 | SC | 0.5 | LB A/A | POSPRE | A | 7.88 bcd | 7.88 ab | 8.13 a | 8.50 a |
| | | 480 | SC | 1.5 | LB A/A | POSPRE | A | | | | |
| 5 | A15879 | 476 | SC | 1 | LB A/A | POSPRE | B | 8.25 ab | 8.00 ab | 8.13 a | 8.25 a |
| 6 | A15879 | 476 | SC | 2 | LB A/A | POSPRE | B | 8.13 abc | 8.00 ab | 8.13 a | 8.13 a |
| 7 | A15879 A15879 | 476 | SC | 0.5 | LB A/A | POSPRE | A | 8.00 a-d | 7.75 b | 8.25 a | 8.25 a |
| | | 476 | SC | 0.5 | LB A/A | POSPOS | C | | | | |
| 8 | A15879 A15879 | 476 | SC | 1 | LB A/A | POSPRE | A | 7.75 bcd | 7.63 b | 8.13 a | 8.13 a |
| | | 476 | SC | 1 | LB A/A | POSPRE | C | | | | |
| 9 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.125 | LB A/A | POSPRE | A | 7.50 d | 8.00 ab | 8.38 a | 8.38 a |
| | | 480 | SC | 0.375 | LB A/A | POSPRE | A | | | | |
| | | 480 | SC | 0.125 | LB A/A | POSPOS | C | | | | |
| | | 480 | SC | 0.375 | LB A/A | POSPRE | C | | | | |
| 10 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.25 | LB A/A | POSPRE | A | 7.63 cd | 7.38 b | 8.38 a | 8.38 a |
| | | 480 | SC | 0.75 | LB A/A | POSPRE | A | | | | |
| | | 480 | SC | 0.25 | LB A/A | POSPRE | C | | | | |
| | | 480 | SC | 0.75 | LB A/A | POSPRE | C | | | | |
| 11 | CHECK UNTREATED | | | | | | | 8.50 a | 8.63 a | 8.50 a | 8.63 a |
| LSD (P=.05) | | | | | | 0.371 | 0.529 | 0.323 | 0.375 | | |
| Standard Deviation | | | | | | 0.257 | 0.367 | 0.224 | 0.260 | | |
| CV | | | | | | 3.23 | 4.67 | 2.7 | 3.11 | | |
| Bartlett's X2 | | | | | | 2.441 | 4.01 | 0.109 | 1.475 | | |
| P(Bartlett's X2) | | | | | | 0.785 | 0.856 | 1.00 | 0.997 | | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Tolerance of Kentucky bluegrass to various treatments

Trial ID: 0705TG5
 Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
 Investigator: PRASANTA C. BHOWMIK

| Crop Code | | | | | | DIGSA | DIGSA | DIGSA | DIGSA | | |
|--------------------|------------------------------------------------------|-----------|-----------|-------|-----------|-----------|-----------|-----------|-----------|--------|--------|
| Rating Data Type | | | | | | Control | Control | Control | Control | | |
| Rating Unit | | | | | | percent | percent | percent | percent | | |
| Rating Date | | | | | | Jun-22-07 | Jul-07-07 | Jul-24-07 | Aug-15-07 | | |
| Trt-Eval Interval | | | | | | 7 DA-A | 22 DA-A | 39 DA-A | 61 DA-A | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Grow Stg | Appl Code | | | | |
| 1 | A15879 | 476 | SC | 1 | LB A/A | POSPRE A | A | 65.0 a | 60.0 a | 53.8 a | 57.5 a |
| 2 | A15879 | 476 | SC | 2 | LB A/A | POSPRE A | A | 67.5 a | 52.5 a | 35.0 a | 40.0 a |
| 3 | A12738 BARRICADE 4 FL | 480 | SC | 0.25 | LB A/A | POSPRE A | A | 70.0 a | 51.3 a | 45.0 a | 47.5 a |
| | | 480 | SC | 0.75 | LB A/A | POSPRE A | A | | | | |
| 4 | A12738 BARRICADE 4 FL | 480 | SC | 0.5 | LB A/A | POSPRE A | A | 75.0 a | 68.8 a | 50.0 a | 52.5 a |
| | | 480 | SC | 1.5 | LB A/A | POSPRE A | A | | | | |
| 5 | A15879 | 476 | SC | 1 | LB A/A | POSPRE B | B | 77.5 a | 70.0 a | 80.0 a | 72.5 a |
| 6 | A15879 | 476 | SC | 2 | LB A/A | POSPRE B | B | 80.0 a | 62.5 a | 55.0 a | 51.3 a |
| 7 | A15879 A15879 | 476 | SC | 0.5 | LB A/A | POSPRE A | A | 71.3 a | 68.8 a | 60.0 a | 58.8 a |
| | | 476 | SC | 0.5 | LB A/A | POSPOS C | C | | | | |
| 8 | A15879 A15879 | 476 | SC | 1 | LB A/A | POSPRE A | A | 72.5 a | 58.8 a | 40.0 a | 37.5 a |
| | | 476 | SC | 1 | LB A/A | POSPRE C | C | | | | |
| 9 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.125 | LB A/A | POSPRE A | A | 78.8 a | 60.0 a | 67.5 a | 61.3 a |
| | | 480 | SC | 0.375 | LB A/A | POSPRE A | A | | | | |
| | | 480 | SC | 0.125 | LB A/A | POSPOS C | C | | | | |
| | | 480 | SC | 0.375 | LB A/A | POSPRE C | C | | | | |
| 10 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.25 | LB A/A | POSPRE A | A | 77.5 a | 67.5 a | 60.0 a | 50.0 a |
| | | 480 | SC | 0.75 | LB A/A | POSPRE A | A | | | | |
| | | 480 | SC | 0.25 | LB A/A | POSPRE C | C | | | | |
| | | 480 | SC | 0.75 | LB A/A | POSPRE C | C | | | | |
| 11 | CHECK UNTREATED | | | | | | | 0.0 b | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | 13.53 | 19.72 | 31.01 | 23.64 | | |
| Standard Deviation | | | | | | 9.37 | 13.66 | 21.48 | 16.37 | | |
| CV | | | | | | 14.02 | 24.23 | 43.25 | 34.06 | | |
| Bartlett's X2 | | | | | | 9.896 | 6.21 | 6.09 | 6.532 | | |
| P(Bartlett's X2) | | | | | | 0.359 | 0.719 | 0.731 | 0.686 | | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Tolerance of Kentucky bluegrass to various treatments

Trial ID: 0705TG5
 Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
 Investigator: PRASANTA C. BHOWMIK

| Crop Code | | | | | | TRFRE | TRFRE | TRFRE | TRFRE | | |
|--------------------|------------------------------------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|--------|--------|
| Rating Data Type | | | | | | Control | Control | Control | Control | | |
| Rating Unit | | | | | | percent | percent | percent | percent | | |
| Rating Date | | | | | | Jun-22-07 | Jul-07-07 | Jul-24-07 | Aug-15-07 | | |
| Trt-Eval Interval | | | | | | 7 DA-A | 22 DA-A | 39 DA-A | 61 DA-A | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Grow Unit | Appl Stg | Code | | | | |
| 1 | A15879 | 476 | SC | 1 LB | A/A | POSPRE | A | 60.0 b | 47.5 a | 60.0 a | 57.5 a |
| 2 | A15879 | 476 | SC | 2 LB | A/A | POSPRE | A | 60.0 b | 57.5 a | 62.5 a | 60.0 a |
| 3 | A12738 BARRICADE 4 FL | 480 | SC | 0.25 LB | A/A | POSPRE | A | 71.3 ab | 66.3 a | 70.0 a | 71.3 a |
| | | 480 | SC | 0.75 LB | A/A | POSPRE | A | | | | |
| 4 | A12738 BARRICADE 4 FL | 480 | SC | 0.5 LB | A/A | POSPRE | A | 71.3 ab | 57.5 a | 71.3 a | 65.0 a |
| | | 480 | SC | 1.5 LB | A/A | POSPRE | A | | | | |
| 5 | A15879 | 476 | SC | 1 LB | A/A | POSPRE | B | 77.5 a | 72.5 a | 76.3 a | 80.0 a |
| 6 | A15879 | 476 | SC | 2 LB | A/A | POSPRE | B | 81.3 a | 76.3 a | 80.0 a | 75.0 a |
| 7 | A15879 A15879 | 476 | SC | 0.5 LB | A/A | POSPRE | A | 68.8 ab | 66.3 a | 75.0 a | 72.5 a |
| | | 476 | SC | 0.5 LB | A/A | POSPOS | C | | | | |
| 8 | A15879 A15879 | 476 | SC | 1 LB | A/A | POSPRE | A | 72.5 ab | 58.8 a | 65.0 a | 66.3 a |
| | | 476 | SC | 1 LB | A/A | POSPRE | C | | | | |
| 9 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.125 LB | A/A | POSPRE | A | 75.0 a | 63.8 a | 55.0 a | 55.0 a |
| | | 480 | SC | 0.375 LB | A/A | POSPRE | A | | | | |
| | | 480 | SC | 0.125 LB | A/A | POSPOS | C | | | | |
| | | 480 | SC | 0.375 LB | A/A | POSPRE | C | | | | |
| 10 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.25 LB | A/A | POSPRE | A | 73.8 a | 56.3 a | 67.5 a | 62.5 a |
| | | 480 | SC | 0.75 LB | A/A | POSPRE | A | | | | |
| | | 480 | SC | 0.25 LB | A/A | POSPRE | C | | | | |
| | | 480 | SC | 0.75 LB | A/A | POSPRE | C | | | | |
| 11 | CHECK UNTREATED | | | | | | | 0.0 c | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | 8.60 | 17.56 | 19.12 | 22.30 | | |
| Standard Deviation | | | | | | 5.96 | 12.16 | 13.24 | 15.44 | | |
| CV | | | | | | 9.21 | 21.49 | 21.35 | 25.54 | | |
| Bartlett's X2 | | | | | | 9.523 | 13.644 | 8.365 | 7.135 | | |
| P(Bartlett's X2) | | | | | | 0.30 | 0.136 | 0.399 | 0.623 | | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Tolerance of Kentucky bluegrass to various treatments

Trial ID: 0705TG5
 Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
 Investigator: PRASANTA C. BHOWMIK

| Crop Code | | | | | | STEME | STEME | STEME | STEME | |
|--------------------|------------------------------------------------------|-----------|-----------|--------------|----------|-----------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | | Control | Control | Control | Control | |
| Rating Unit | | | | | | percent | percent | percent | percent | |
| Rating Date | | | | | | Jun-22-07 | Jul-07-07 | Jul-24-07 | Aug-15-07 | |
| Trt-Eval Interval | | | | | | 7 DA-A | 22 DA-A | 39 DA-A | 61 DA-A | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Grow Stg | Appl Code | | | | |
| 1 | A15879 | 476 | SC | 1 LB A/A | POSPRE A | A | 44.5 ab | 55.0 a | 65.0 a | 60.0 a |
| 2 | A15879 | 476 | SC | 2 LB A/A | POSPRE A | A | 51.3 ab | 56.7 a | 63.3 a | 56.7 a |
| 3 | A12738 BARRICADE 4 FL | 480 | SC | 0.25 LB A/A | POSPRE A | A | 48.0 ab | 55.0 a | 75.0 a | 65.0 a |
| | | 480 | SC | 0.75 LB A/A | POSPRE A | A | | | | |
| 4 | A12738 BARRICADE 4 FL | 480 | SC | 0.5 LB A/A | POSPRE A | A | 48.0 ab | 50.0 a | 60.0 a | 60.0 a |
| | | 480 | SC | 1.5 LB A/A | POSPRE A | A | | | | |
| 5 | A15879 | 476 | SC | 1 LB A/A | POSPRE B | B | 54.7 ab | 50.0 a | 55.0 a | 55.0 a |
| 6 | A15879 | 476 | SC | 2 LB A/A | POSPRE B | B | 69.7 a | 65.0 a | 75.0 a | 70.0 a |
| 7 | A15879 A15879 | 476 | SC | 0.5 LB A/A | POSPRE A | A | 31.4 b | 40.0 a | 50.0 a | 55.0 a |
| | | 476 | SC | 0.5 LB A/A | POSPOS C | C | | | | |
| 8 | A15879 A15879 | 476 | SC | 1 LB A/A | POSPRE A | A | 62.5 a | 56.7 a | 56.7 a | 48.3 a |
| | | 476 | SC | 1 LB A/A | POSPRE C | C | | | | |
| 9 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.125 LB A/A | POSPRE A | A | 65.0 a | 65.0 a | 60.0 a | 56.7 a |
| | | 480 | SC | 0.375 LB A/A | POSPRE A | A | | | | |
| | | 480 | SC | 0.125 LB A/A | POSPOS C | C | | | | |
| | | 480 | SC | 0.375 LB A/A | POSPRE C | C | | | | |
| 10 | A12738 BARRICADE 4 FL A12738 BARRICADE 4 FL | 480 | SC | 0.25 LB A/A | POSPRE A | A | 66.3 a | 61.7 a | 58.3 a | 53.3 a |
| | | 480 | SC | 0.75 LB A/A | POSPRE A | A | | | | |
| | | 480 | SC | 0.25 LB A/A | POSPRE C | C | | | | |
| | | 480 | SC | 0.75 LB A/A | POSPRE C | C | | | | |
| 11 | CHECK UNTREATED | | | | | | 0.0 c | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | 15.70 | 16.94 | 20.17 | 14.03 | |
| Standard Deviation | | | | | | 10.76 | 9.67 | 11.52 | 8.01 | |
| CV | | | | | | 21.85 | 19.17 | 20.49 | 15.19 | |
| Bartlett's X2 | | | | | | 7.534 | 4.454 | 7.92 | 3.181 | |
| P(Bartlett's X2) | | | | | | 0.48 | 0.814 | 0.441 | 0.868 | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

| | | APPLICATION EQUIPMENT | | | | | |
|-----------------------|-----------|-----------------------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E | F |
| Appl. Equipment: | BACKPACK | _____ | _____ | _____ | _____ | _____ | _____ |
| Operating Pressure: | 22 PSI | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Type: | TEEJET | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Size: | 110004 VS | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzle Spacing, Unit: | 20 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Nozzles/Row: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Band Width, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Boom Length, Unit: | 20 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Boom Height, Unit: | 17 INCH | _____ | _____ | _____ | _____ | _____ | _____ |
| Ground Speed, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Incorporation Equip.: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Hours to Incorp.: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Incorp. Depth, Unit: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Carrier: | WATER | _____ | _____ | _____ | _____ | _____ | _____ |
| Spray Volume, Unit: | 50 GPA | _____ | _____ | _____ | _____ | _____ | _____ |
| Spray pH: | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Propellant: | CO2 | _____ | _____ | _____ | _____ | _____ | _____ |
| Tank Mix (Y/N): | - | _____ | _____ | _____ | _____ | _____ | _____ |

UNIVERSITY OF MASSACHUSETTS-AMHERST

Performance of various products in weed control and on tolerance of perennial ryegrass

Trial ID: 0706TG6
Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
Investigator: PRASANTA C. BHOWMIK

| Weed Code | | | | | | LOLPE | LOLPE | LOLPE | |
|--------------------|-------------------|-----------|-----------|-----------|-------------|-----------|-----------|-----------|--------|
| Crop Code | | | | | | QUALITY | QUALITY | QUALITY | |
| Rating Data Type | | | | | | 1-9 | 1-9 | 1-9 | |
| Rating Unit | | | | | | May-10-07 | May-22-07 | Jun-15-07 | |
| Rating Date | | | | | | 6 DA-A | 18 DA-A | 42 DA-A | |
| Trt-Eval Interval | | | | | | | | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate Rate | Unit | Grow Stg | | | |
| 1 | AND7023 0.373 GR | 0.37 | GR | 4 | LB/1000 FT2 | POSPRE | 8.13 a | 8.38 a | 8.25 a |
| | AND7030 0.086 GR | 0.09 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7030 0.086 GR | 0.09 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7030 0.086 GR | 0.09 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 2 | AND7010 0.402 GR | 0.4 | GR | 4 | LB/1000 FT2 | POSPRE | 8.25 a | 8.25 a | 8.25 a |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 3 | AND7024 0.430GR | 0.43 | GR | 4 | LB/1000 FT2 | POSPRE | 8.38 a | 8.38 a | 8.25 a |
| | AND7032 0.143GR | 0.14 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7032 0.143GR | 0.14 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7032 0.143GR | 0.14 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 4 | AND7028 0.330GR | 0.33 | GR | 4 | LB/1000 FT2 | POSPRE | 8.38 a | 8.50 a | 8.50 a |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 5 | AND7012 0.215 GR | 0.22 | GR | 4 | LB/1000 FT2 | POSPRE | 8.50 a | 8.50 a | 8.50 a |
| | AND7039 | 0.72 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7039 | 0.72 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7039 | 0.72 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 6 | DIMENSION 2 EW | 240 | EW | 0.374 | LB/A | POSPRE | 8.00 a | 8.00 a | 8.13 a |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPRE | | | |
| | TRIPLET SELECTIVE | 311. | SL | 4 | PT/A | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | TRIPLET SELECTIVE | 311. | SL | 4 | PT/A | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 7 | AND7038 | | GR | 4 | LB/1000 FT2 | POSPRE | 8.38 a | 8.25 a | 8.25 a |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| LSD (P=.05) | | | | | | 0.449 | 0.416 | 0.377 | |
| Standard Deviation | | | | | | 0.302 | 0.280 | 0.254 | |
| CV | | | | | | 3.65 | 3.36 | 3.06 | |
| Bartlett's X2 | | | | | | 2.428 | 1.701 | 0.827 | |
| P(Bartlett's X2) | | | | | | 0.787 | 0.791 | 0.975 | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Performance of various products in weed control and on tolerance of perennial ryegrass

Trial ID: 0706TG6
 Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
 Investigator: PRASANTA C. BHOWMIK

| Weed Code | | | | | | TRFRE | TRFRE | TRFRE | |
|--------------------|-------------------|-----------|-----------|-----------|-------------|-----------|-----------|-----------|---------|
| Crop Code | | | | | | CONTROL | CONTROL | CONTROL | |
| Rating Data Type | | | | | | PERCENT | PERCENT | PERCENT | |
| Rating Unit | | | | | | Jul-07-07 | Jul-24-07 | Aug-15-07 | |
| Rating Date | | | | | | 64 DA-A | 81 DA-A | 103 DA-A | |
| Trt-Eval Interval | | | | | | | | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate Rate | Unit | Grow Stg | | | |
| 1 | AND7023 0.373 GR | 0.37 | GR | 4 | LB/1000 FT2 | POSPRE | 75.0 a | 97.0 ab | 99.5 a |
| | AND7030 0.086 GR | 0.09 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7030 0.086 GR | 0.09 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7030 0.086 GR | 0.09 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 2 | AND7010 0.402 GR | 0.4 | GR | 4 | LB/1000 FT2 | POSPRE | 83.8 a | 99.5 a | 98.8 a |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 3 | AND7024 0.430GR | 0.43 | GR | 4 | LB/1000 FT2 | POSPRE | 78.8 a | 100.0 a | 100.0 a |
| | AND7032 0.143GR | 0.14 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7032 0.143GR | 0.14 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7032 0.143GR | 0.14 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 4 | AND7028 0.330GR | 0.33 | GR | 4 | LB/1000 FT2 | POSPRE | 85.0 a | 95.0 ab | 99.5 a |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 5 | AND7012 0.215 GR | 0.22 | GR | 4 | LB/1000 FT2 | POSPRE | 75.0 a | 98.3 a | 99.5 a |
| | AND7039 | 0.72 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7039 | 0.72 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7039 | 0.72 | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 6 | DIMENSION 2 EW | 240 | EW | 0.374 | LB/A | POSPRE | 86.3 a | 96.3 ab | 98.8 a |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPRE | | | |
| | TRIPLET SELECTIVE | 311. | SL | 4 | PT/A | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | TRIPLET SELECTIVE | 311. | SL | 4 | PT/A | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| 7 | AND7038 | | GR | 4 | LB/1000 FT2 | POSPRE | 60.0 b | 87.0 b | 85.0 b |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| | AND7038 | | GR | 4 | LB/1000 FT2 | POSPOS | | | |
| LSD (P=.05) | | | | | | 8.90 | 7.65 | 4.10 | |
| Standard Deviation | | | | | | 5.99 | 5.15 | 2.76 | |
| CV | | | | | | 7.71 | 5.36 | 2.83 | |
| Bartlett's X2 | | | | | | 3.831 | 17.751 | 14.85 | |
| P(Bartlett's X2) | | | | | | 0.70 | 0.003* | 0.011* | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Performance of various products in weed control and on tolerance of
perennial ryegrass

Trial ID: 0706TG6
Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
Investigator: PRASANTA C. BHOWMIK

| Weed Code | | | | | | STEME | STEME | STEME |
|--------------------|-------------------|-----------|-----------|---------------|----------|-----------|-----------|-----------|
| Crop Code | | | | | | CONTROL | CONTROL | CONTROL |
| Rating Data Type | | | | | | PERCENT | PERCENT | PERCENT |
| Rating Unit | | | | | | Jul-07-07 | Jul-24-07 | Aug-15-07 |
| Rating Date | | | | | | 64 DA-A | 81 DA-A | 103 DA-A |
| Trt-Eval Interval | | | | | | | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate Unit | Grow Stg | | | |
| 1 | AND7023 0.373 GR | 0.37 GR | GR | 4 LB/1000 FT2 | POSPRE | 85.0 a | 100.0 a | 99.5 a |
| | AND7030 0.086 GR | 0.09 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7030 0.086 GR | 0.09 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7030 0.086 GR | 0.09 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| 2 | AND7010 0.402 GR | 0.4 GR | GR | 4 LB/1000 FT2 | POSPRE | 90.0 a | 99.5 a | 100.0 a |
| | AND7031 0.115 GR | 0.12 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| 3 | AND7024 0.430GR | 0.43 GR | GR | 4 LB/1000 FT2 | POSPRE | 85.0 a | 100.0 a | 100.0 a |
| | AND7032 0.143GR | 0.14 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7032 0.143GR | 0.14 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7032 0.143GR | 0.14 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| 4 | AND7028 0.330GR | 0.33 GR | GR | 4 LB/1000 FT2 | POSPRE | 87.5 a | 100.0 a | 100.0 a |
| | AND7031 0.115 GR | 0.12 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7031 0.115 GR | 0.12 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| 5 | AND7012 0.215 GR | 0.22 GR | GR | 4 LB/1000 FT2 | POSPRE | 63.3 b | 100.0 a | 99.3 a |
| | AND7039 | 0.72 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7039 | 0.72 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7039 | 0.72 GR | GR | 4 LB/1000 FT2 | POSPOS | | | |
| 6 | DIMENSION 2 EW | 240 EW | | 0.374 LB/A | POSPRE | 75.0 ab | 100.0 a | 100.0 a |
| | AND7038 | GR | | 4 LB/1000 FT2 | POSPRE | | | |
| | TRIPLET SELECTIVE | 311. SL | | 4 PT/A | POSPOS | | | |
| | AND7038 | GR | | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7038 | GR | | 4 LB/1000 FT2 | POSPOS | | | |
| | TRIPLET SELECTIVE | 311. SL | | 4 PT/A | POSPOS | | | |
| | AND7038 | GR | | 4 LB/1000 FT2 | POSPOS | | | |
| 7 | AND7038 | GR | | 4 LB/1000 FT2 | POSPRE | 63.3 b | 100.0 a | 91.7 b |
| | AND7038 | GR | | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7038 | GR | | 4 LB/1000 FT2 | POSPOS | | | |
| | AND7038 | GR | | 4 LB/1000 FT2 | POSPOS | | | |
| LSD (P=.05) | | | | | | 10.32 | 0.65 | 1.90 |
| Standard Deviation | | | | | | 6.81 | 0.43 | 1.25 |
| CV | | | | | | 8.67 | 0.43 | 1.27 |
| Bartlett's X2 | | | | | | 4.473 | 0.0 | 3.128 |
| P(Bartlett's X2) | | | | | | 0.483 | 0.00* | 0.209 |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Performance of various products in weed control and on tolerance of
perennial ryegrass

Trial ID: 0706TG6
Location: TRC-SDF

Study Dir.: PRASANTA C. BHOWMIK
Investigator: PRASANTA C. BHOWMIK

| Weed Code | | | | | TAROF | TAROF | TAROF |
|--------------------|-------------------|-----------|-----------|---------------|-----------|-----------|-----------|
| Crop Code | | | | | CONTROL | CONTROL | CONTROL |
| Rating Data Type | | | | | PERCENT | PERCENT | PERCENT |
| Rating Unit | | | | | Jul-07-07 | Jul-24-07 | Aug-15-07 |
| Rating Date | | | | | 64 DA-A | 81 DA-A | 103 DA-A |
| Trt-Eval Interval | | | | | | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate Unit | Grow Stg | | |
| 1 | AND7023 0.373 GR | 0.37 | GR | 4 LB/1000 FT2 | POSPRE | 90.0 a | 100.0 a |
| | AND7030 0.086 GR | 0.09 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7030 0.086 GR | 0.09 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7030 0.086 GR | 0.09 | GR | 4 LB/1000 FT2 | POSPOS | | |
| 2 | AND7010 0.402 GR | 0.4 | GR | 4 LB/1000 FT2 | POSPRE | 83.3 a | 100.0 a |
| | AND7031 0.115 GR | 0.12 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 LB/1000 FT2 | POSPOS | | |
| 3 | AND7024 0.430GR | 0.43 | GR | 4 LB/1000 FT2 | POSPRE | 75.0 a | 100.0 a |
| | AND7032 0.143GR | 0.14 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7032 0.143GR | 0.14 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7032 0.143GR | 0.14 | GR | 4 LB/1000 FT2 | POSPOS | | |
| 4 | AND7028 0.330GR | 0.33 | GR | 4 LB/1000 FT2 | POSPRE | 80.0 a | 100.0 a |
| | AND7031 0.115 GR | 0.12 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7031 0.115 GR | 0.12 | GR | 4 LB/1000 FT2 | POSPOS | | |
| 5 | AND7012 0.215 GR | 0.22 | GR | 4 LB/1000 FT2 | POSPRE | 70.0 a | 100.0 a |
| | AND7039 | 0.72 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7039 | 0.72 | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7039 | 0.72 | GR | 4 LB/1000 FT2 | POSPOS | | |
| 6 | DIMENSION 2 EW | 240 | EW | 0.374 LB/A | POSPRE | 76.7 a | 100.0 a |
| | AND7038 | | GR | 4 LB/1000 FT2 | POSPRE | | |
| | TRIPLET SELECTIVE | 311. | SL | 4 PT/A | POSPOS | | |
| | AND7038 | | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7038 | | GR | 4 LB/1000 FT2 | POSPOS | | |
| | TRIPLET SELECTIVE | 311. | SL | 4 PT/A | POSPOS | | |
| | AND7038 | | GR | 4 LB/1000 FT2 | POSPOS | | |
| 7 | AND7038 | | GR | 4 LB/1000 FT2 | POSPRE | 73.3 a | 100.0 a |
| | AND7038 | | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7038 | | GR | 4 LB/1000 FT2 | POSPOS | | |
| | AND7038 | | GR | 4 LB/1000 FT2 | POSPOS | | |
| LSD (P=.05) | | | | | 11.59 | 0.00 | 0.00 |
| Standard Deviation | | | | | 6.37 | 0.00 | 0.00 |
| CV | | | | | 8.14 | 0.0 | 0.0 |
| Bartlett's X2 | | | | | 0.07 | 0.0 | 0.0 |
| P(Bartlett's X2) | | | | | 0.995 | 0.00* | 0.00* |

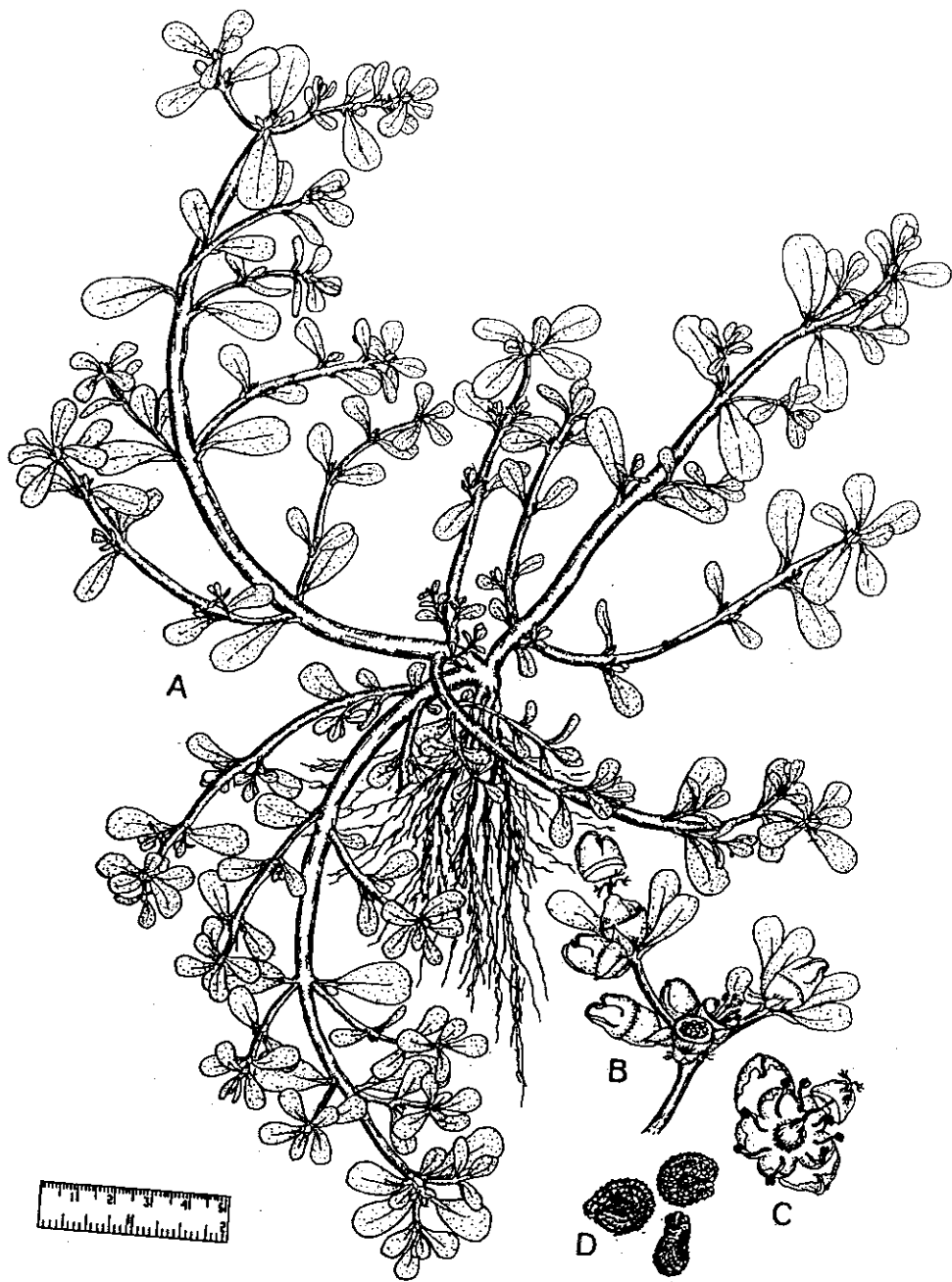
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

| | | | |
|-----------------------------------------------------------------------------------------------|--|-----------------------------------|--|
| Performance of various products in weed control and on tolerance of perennial ryegrass | | | |
| Trial ID: 0706TG6 | | Study Dir.: PRASANTA C. BHOWMIK | |
| Location: TRC-SDF | | Investigator: PRASANTA C. BHOWMIK | |

| | | | | | DIGSA | DIGSA | DIGSA | DIGSA | | |
|--------------------|-------------------|------------------|-------------|----------------|-----------------|-----------------|-----------------|-----------------|--------|--------|
| | | | | | CONTROL PERCENT | CONTROL PERCENT | CONTROL PERCENT | CONTROL PERCENT | | |
| | | | | | Jun-15-07 | Jul-07-07 | Jul-24-07 | Aug-15-07 | | |
| | | | | | 42 DA-A | 64 DA-A | 81 DA-A | 103 DA-A | | |
| Weed Code | Crop Code | Rating Data Type | Rating Unit | Rating Date | | | | | | |
| Trt-Eval Interval | | | | | | | | | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate Rate Unit | Grow Stg | | | | | |
| 1 | AND7023 | 0.373 | GR | 0.37 GR | 4 LB/1000 FT2 | POSPRE | 76.3 a | 80.0 a | 90.0 a | 93.3 a |
| | AND7030 | 0.086 | GR | 0.09 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7030 | 0.086 | GR | 0.09 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7030 | 0.086 | GR | 0.09 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| 2 | AND7010 | 0.402 | GR | 0.4 GR | 4 LB/1000 FT2 | POSPRE | 72.5 a | 82.5 a | 85.0 a | 92.5 a |
| | AND7031 | 0.115 | GR | 0.12 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7031 | 0.115 | GR | 0.12 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7031 | 0.115 | GR | 0.12 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| 3 | AND7024 | 0.430 | GR | 0.43 GR | 4 LB/1000 FT2 | POSPRE | 77.5 a | 78.8 a | 89.5 a | 94.5 a |
| | AND7032 | 0.143 | GR | 0.14 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7032 | 0.143 | GR | 0.14 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7032 | 0.143 | GR | 0.14 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| 4 | AND7028 | 0.330 | GR | 0.33 GR | 4 LB/1000 FT2 | POSPRE | 78.8 a | 87.5 a | 96.5 a | 97.8 a |
| | AND7031 | 0.115 | GR | 0.12 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7031 | 0.115 | GR | 0.12 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7031 | 0.115 | GR | 0.12 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| 5 | AND7012 | 0.215 | GR | 0.22 GR | 4 LB/1000 FT2 | POSPRE | 85.0 a | 87.5 a | 95.0 a | 94.5 a |
| | AND7039 | | | 0.72 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7039 | | | 0.72 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7039 | | | 0.72 GR | 4 LB/1000 FT2 | POSPOS | | | | |
| 6 | DIMENSION 2 EW | 240 | EW | 0.374 LB/A | 4 LB/1000 FT2 | POSPRE | 75.0 a | 86.3 a | 82.5 a | 89.5 a |
| | AND7038 | | GR | | 4 LB/1000 FT2 | POSPRE | | | | |
| | TRIPLET SELECTIVE | 311 | SL | | 4 PT/A | POSPOS | | | | |
| | AND7038 | | GR | | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7038 | | GR | | 4 LB/1000 FT2 | POSPOS | | | | |
| | TRIPLET SELECTIVE | 311 | SL | | 4 PT/A | POSPOS | | | | |
| | AND7038 | | GR | | 4 LB/1000 FT2 | POSPOS | | | | |
| 7 | AND7038 | | GR | | 4 LB/1000 FT2 | POSPRE | 57.5 b | 45.0 b | 35.0 b | 37.5 b |
| | AND7038 | | GR | | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7038 | | GR | | 4 LB/1000 FT2 | POSPOS | | | | |
| | AND7038 | | GR | | 4 LB/1000 FT2 | POSPOS | | | | |
| LSD (P=.05) | | | | | 10.64 | 10.05 | 14.62 | 18.99 | | |
| Standard Deviation | | | | | 7.16 | 6.76 | 9.84 | 12.78 | | |
| CV | | | | | 9.59 | 8.65 | 12.01 | 14.93 | | |
| Bartlett's X2 | | | | | 2.741 | 4.712 | 14.152 | 34.556 | | |
| P(Bartlett's X2) | | | | | 0.841 | 0.581 | 0.015* | 0.001* | | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)



UNIVERSITY OF MASSACHUSETTS-AMHERST

APPLICATION DESCRIPTION

| | A | B |
|----------------------|-----------|--------|
| Application Date: | Jul-06-07 | |
| Time of Day: | 11.00 AM | |
| Application Method: | CO2 | |
| Application Timing: | POST | |
| Applic. Placement: | | |
| Air Temp., Unit: | 82.4 F | |
| % Relative Humidity: | 35 | |
| Wind Velocity, Unit: | 2 MPH | |
| Dew Presence (Y/N): | | |
| Water Hardness: | | |
| Soil Temp., Unit: | 78.8 F | 74.4 F |
| Soil Moisture: | | |
| % Cloud Cover: | 5 | |

APPLICATION EQUIPMENT

| | A |
|-----------------------|-----------|
| Appl. Equipment: | BACKPACK |
| Operating Pressure: | 22 PSI |
| Nozzle Type: | TEEJET |
| Nozzle Size: | 110004 VS |
| Nozzle Spacing, Unit: | 20 INCH |
| Nozzles/Row: | |
| Band Width, Unit: | |
| Boom Length, Unit: | 20 INCH |
| Boom Height, Unit: | 17 INCH |
| Ground Speed, Unit: | |
| Incorporation Equip.: | |
| Hours to Incorp.: | |
| Incorp. Depth, Unit: | |
| Carrier: | WATER |
| Spray Volume, Unit: | 30 GPA |
| Spray pH: | |
| Propellant: | CO2 |
| Tank Mix (Y/N): | |

UNIVERSITY OF MASSACHUSETTS-AMHERST

Comparison of various Roundup Pro formulations

Trial ID: 0707TG7
 Location: TRC-SDF

Study Dir.: Prasanta C. Bhowmik
 Investigator: PRASANTA C. BHOWMIK

| Weed Code | | | | | FESAU | FESAU | FESAU | FESAU | FESAU | |
|--------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | CONTROL | CONTROL | CONTROL | CONTROL | CONTROL | |
| Rating Unit | | | | | PERCENT | PERCENT | PERCENT | PERCENT | PERCENT | |
| Rating Date | | | | | Jul-07-07 | Jul-09-07 | Jul-13-07 | Jul-24-07 | Aug-15-07 | |
| Trt-Eval Interval | | | | | 1 DA-A | 3 DA-A | 7 DA-A | 18 DA-A | 40 DA-A | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate Unit | Grow Stg | | | | | |
| 1 | Roundup PRO | 64.9 | WG | 3 LB A/A | | 27.5 a | 37.5 a | 91.5 a | 94.5 a | 97.5 a |
| 2 | MON 76207 | 4.5 | SL | 2 QT/A | | 30.0 a | 36.3 a | 93.3 a | 97.0 a | 97.0 a |
| 3 | MON 76302 | 4.5 | SL | 2 QT/A | | 25.0 a | 32.5 a | 93.3 a | 98.8 a | 99.5 a |
| 4 | UNTREATED CHECK | | | | | 0.0 b | 0.0 b | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | 7.42 | 11.33 | 8.64 | 8.91 | 5.84 |
| Standard Deviation | | | | | | 4.64 | 7.08 | 5.40 | 5.57 | 3.65 |
| CV | | | | | | 22.5 | 26.67 | 7.77 | 7.68 | 4.97 |
| Bartlett's X2 | | | | | | 0.329 | 3.169 | 2.4 | 7.094 | 5.64 |
| P(Bartlett's X2) | | | | | | 0.848 | 0.205 | 0.301 | 0.029* | 0.06 |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Comparison of various Roundup Pro formulations

Trial ID: 0707TG7
Location: TRC-SDF

Study Dir.: Prasanta C. Bhowmik
Investigator: PRASANTA C. BHOWMIK

| Weed Code | | | | | DIGSA CONTROL PERCENT Jul-07-07 1 DA-A | DIGSA CONTROL PERCENT Jul-09-07 3 DA-A | DIGSA CONTROL PERCENT Jul-13-07 7 DA-A | DIGSA CONTROL PERCENT Jul-24-07 18 DA-A | DIGSA CONTROL PERCENT Aug-15-07 40 DA-A | | |
|--------------------|-----------------|-----------|-----------|------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|---------|--------|
| Rating Data Type | | | | | | | | | | | |
| Rating Unit | | | | | | | | | | | |
| Rating Date | | | | | | | | | | | |
| Trt-Eval Interval | | | | | | | | | | | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Grow Stg | | | | | |
| 1 | Roundup PRO | 64.9 | WG | 3 | LB A/A | | 28.8 a | 70.0 a | 96.5 a | 95.0 a | 94.5 a |
| 2 | MON 76207 | 4.5 | SL | 2 | QT/A | | 28.8 a | 76.3 a | 100.0 a | 100.0 a | 94.5 a |
| 3 | MON 76302 | 4.5 | SL | 2 | QT/A | | 35.0 a | 75.0 a | 99.0 a | 100.0 a | 96.5 a |
| 4 | UNTREATED CHECK | | | | | | 0.0 b | 0.0 b | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | 21.45 | 6.29 | 3.78 | 8.00 | 4.52 | | |
| Standard Deviation | | | | | 13.41 | 3.93 | 2.36 | 5.00 | 2.82 | | |
| CV | | | | | 57.99 | 7.11 | 3.2 | 6.78 | 3.96 | | |
| Bartlett's X2 | | | | | 0.064 | 0.1 | 4.136 | 0.0 | 1.303 | | |
| P(Bartlett's X2) | | | | | 0.968 | 0.751 | 0.042* | 0.00* | 0.521 | | |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

UNIVERSITY OF MASSACHUSETTS-AMHERST

Comparison of various Roundup Pro formulations

Trial ID: 0707TG7
 Location: TRC-SDF

Study Dir.: Prasanta C. Bhowmik
 Investigator: PRASANTA C. BHOWMIK

| Weed Code | | | | | TRFRE | TRFRE | TRFRE | TRFRE | TRFRE | |
|--------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
| Rating Data Type | | | | | CONTROL | CONTROL | CONTROL | CONTROL | CONTROL | |
| Rating Unit | | | | | PERCENT | PERCENT | PERCENT | PERCENT | PERCENT | |
| Rating Date | | | | | Jul-07-07 | Jul-09-07 | Jul-13-07 | Jul-24-07 | Aug-15-07 | |
| Trt-Eval Interval | | | | | 1 DA-A | 3 DA-A | 7 DA-A | 18 DA-A | 40 DA-A | |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate Unit | Grow Stg | | | | | |
| 1 | Roundup PRO | 64.9 | WG | 3 LB A/A | | 35.0 a | 85.0 a | 97.8 a | 98.8 a | 97.5 a |
| 2 | MON 76207 | 4.5 | SL | 2 QT/A | | 37.5 a | 81.3 a | 97.0 a | 97.8 a | 98.3 a |
| 3 | MON 76302 | 4.5 | SL | 2 QT/A | | 35.0 a | 78.8 a | 95.3 a | 98.3 a | 99.0 a |
| 4 | UNTREATED CHECK | | | | | 0.0 b | 0.0 b | 0.0 b | 0.0 b | 0.0 b |
| LSD (P=.05) | | | | | | 20.35 | 5.33 | 3.02 | 3.00 | 2.62 |
| Standard Deviation | | | | | | 12.72 | 3.33 | 1.89 | 1.87 | 1.64 |
| CV | | | | | | 47.33 | 5.44 | 2.6 | 2.54 | 2.22 |
| Bartlett's X2 | | | | | | 3.449 | 2.193 | 1.131 | 0.107 | 2.095 |
| P(Bartlett's X2) | | | | | | 0.178 | 0.334 | 0.568 | 0.948 | 0.351 |

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

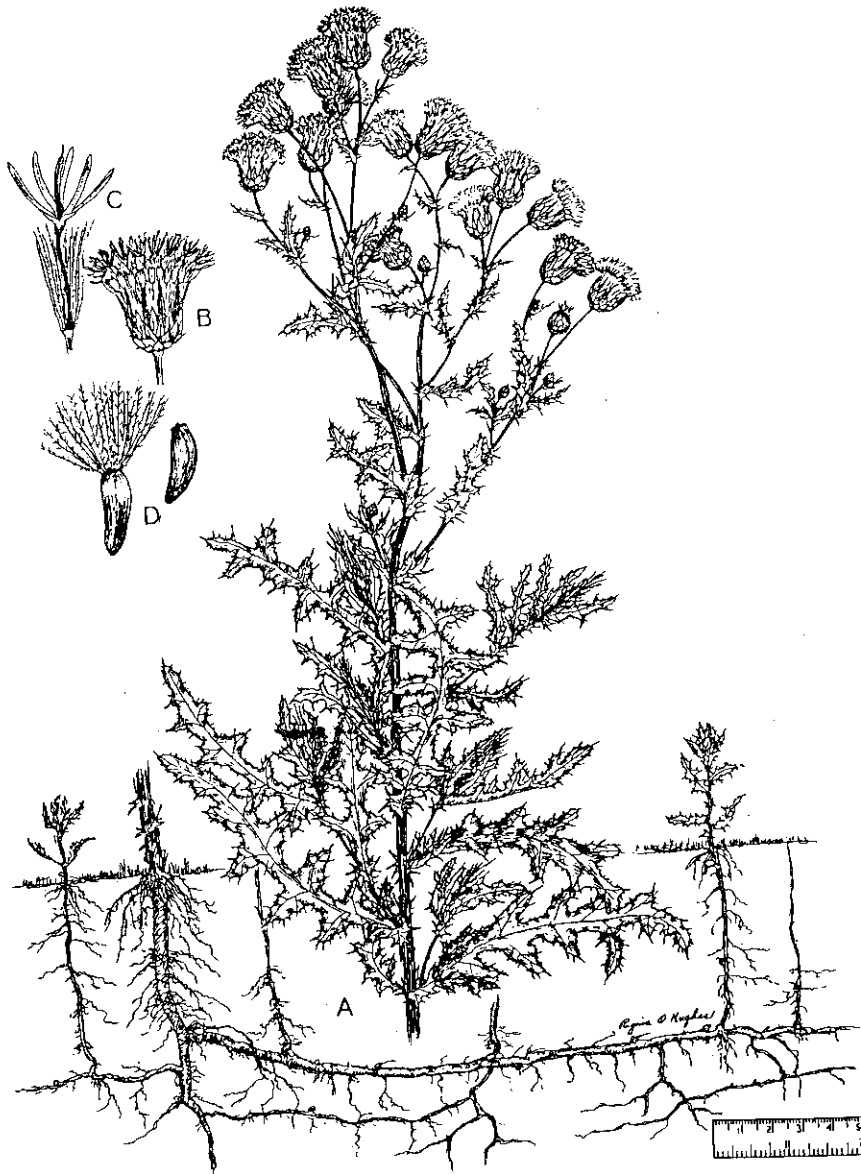
Turfgrass and Weed Code Index

Turfgrass

| | |
|--------------------|-------|
| Kentucky bluegrass | POAPR |
| Creeping bentgrass | AGSPL |
| Tall fescue | FESAR |

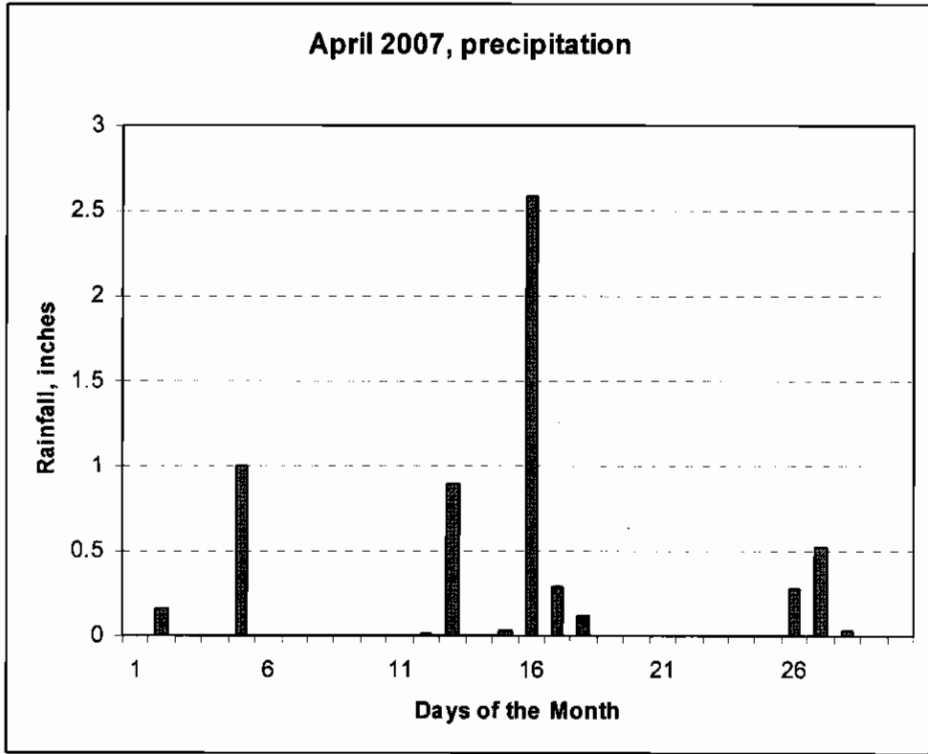
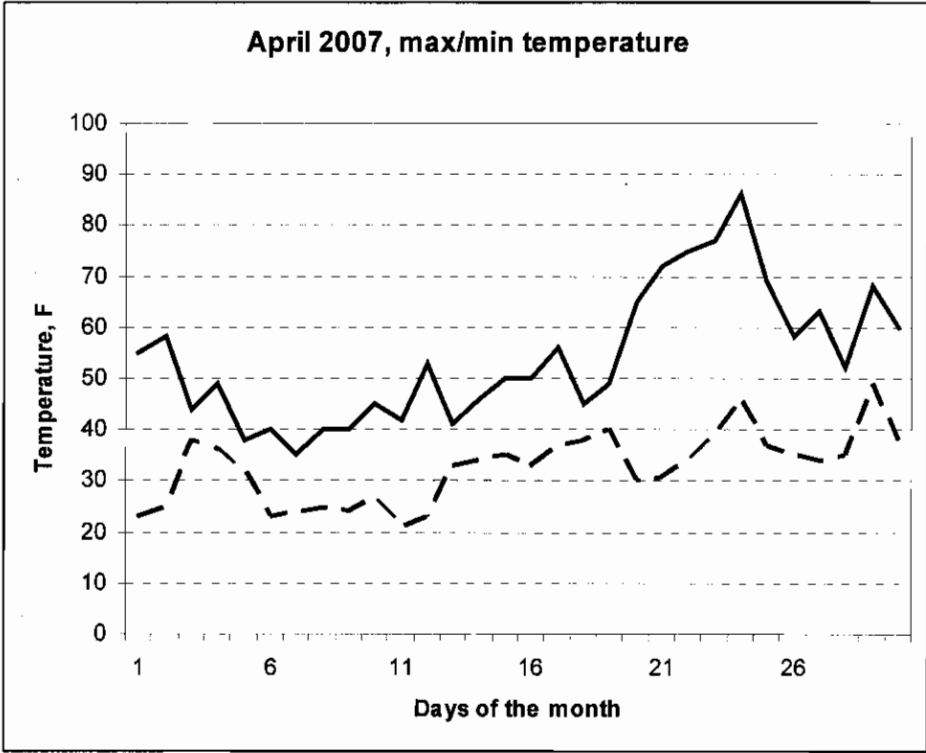
Weeds

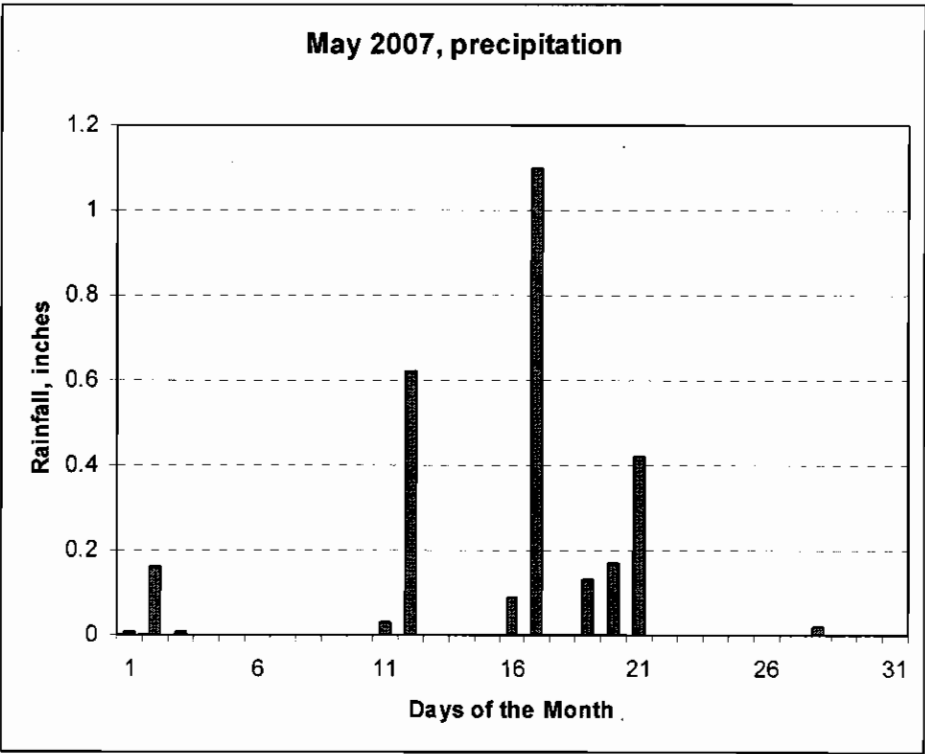
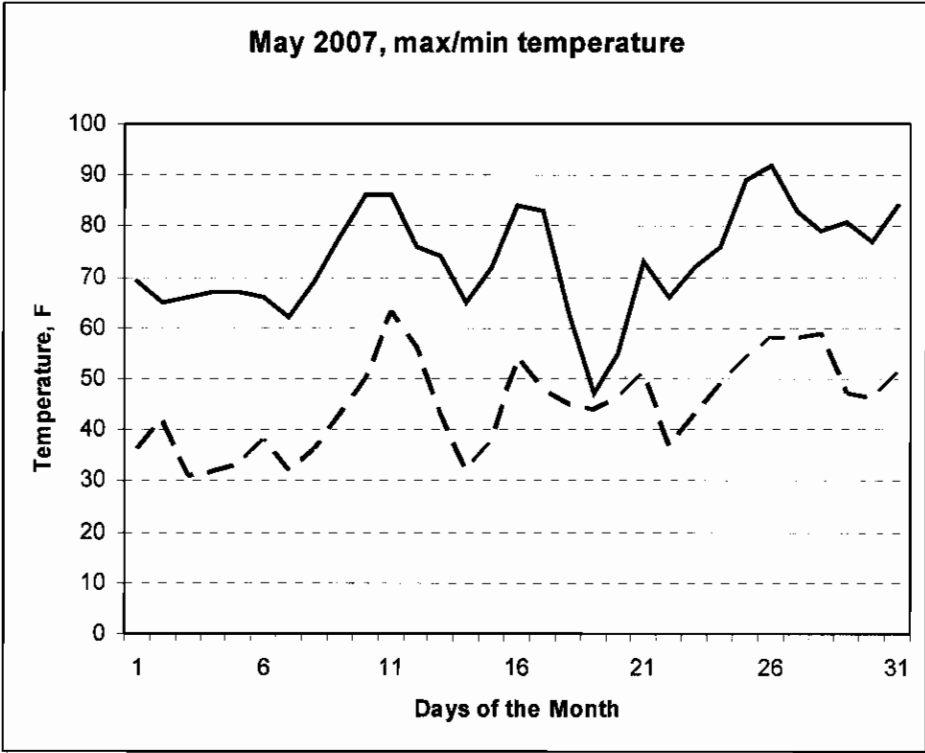
| | |
|---------------------|-------|
| Large crabgrass | DIGSA |
| Annual bluegrass | POAN |
| Yellow foxtail | SETLU |
| White clover | TRIRE |
| Dandelion | TAROF |
| Common chickweed | |
| Mouse-ear chickweed | STEME |
| Common plantain | PLAMA |

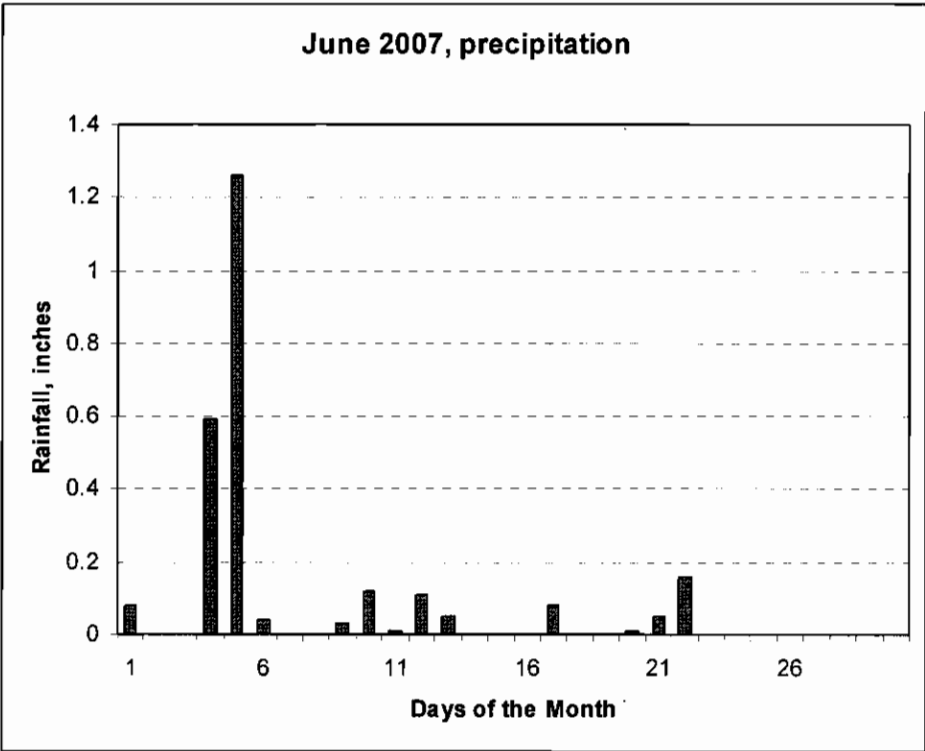
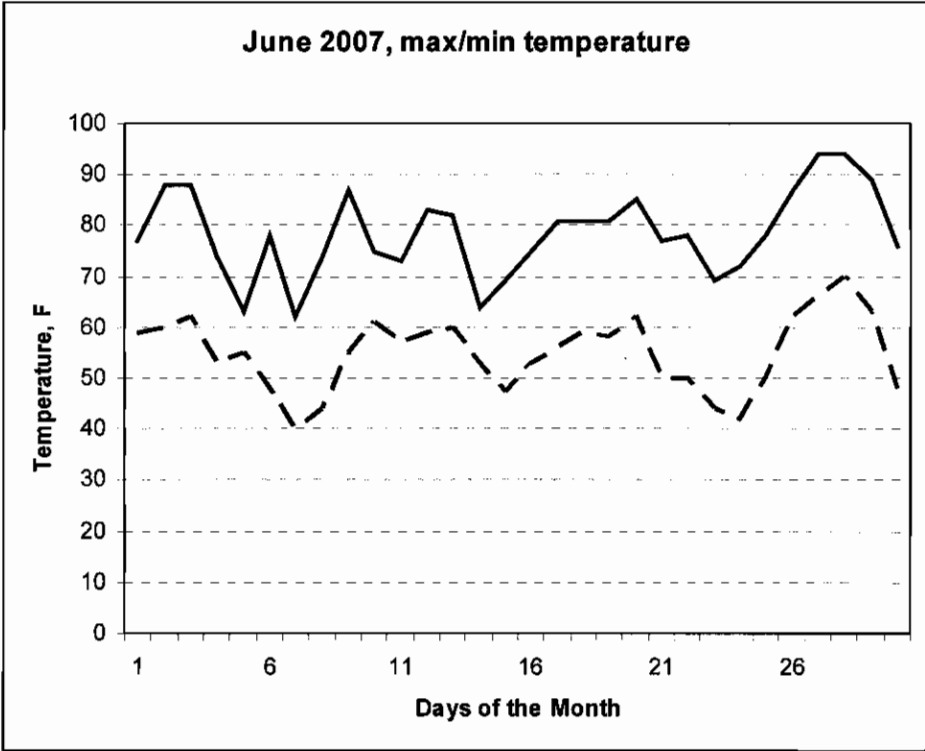


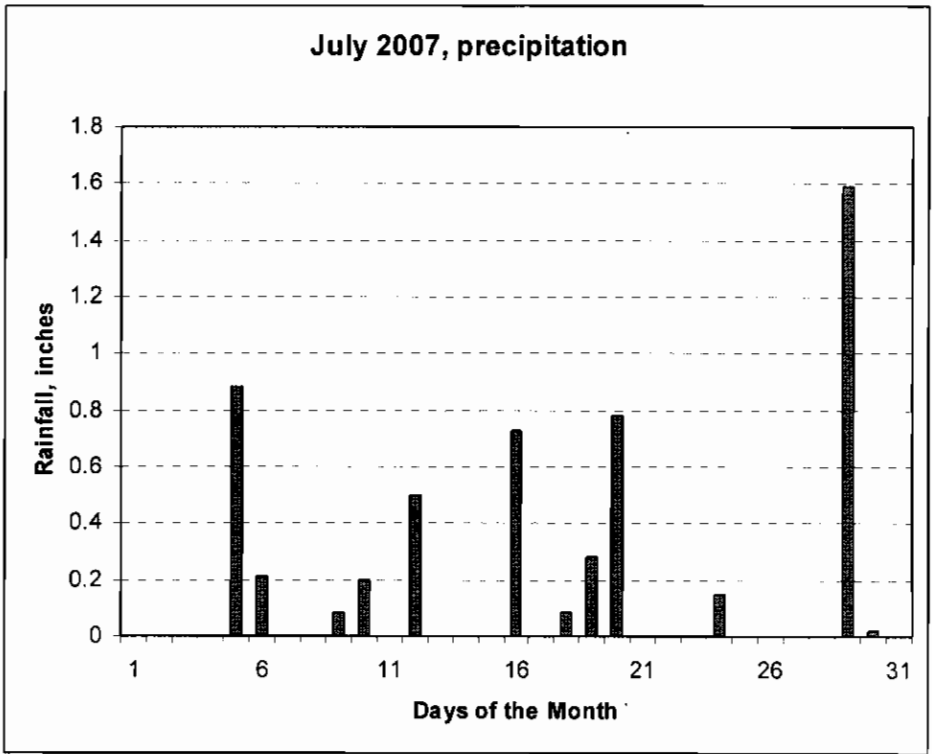
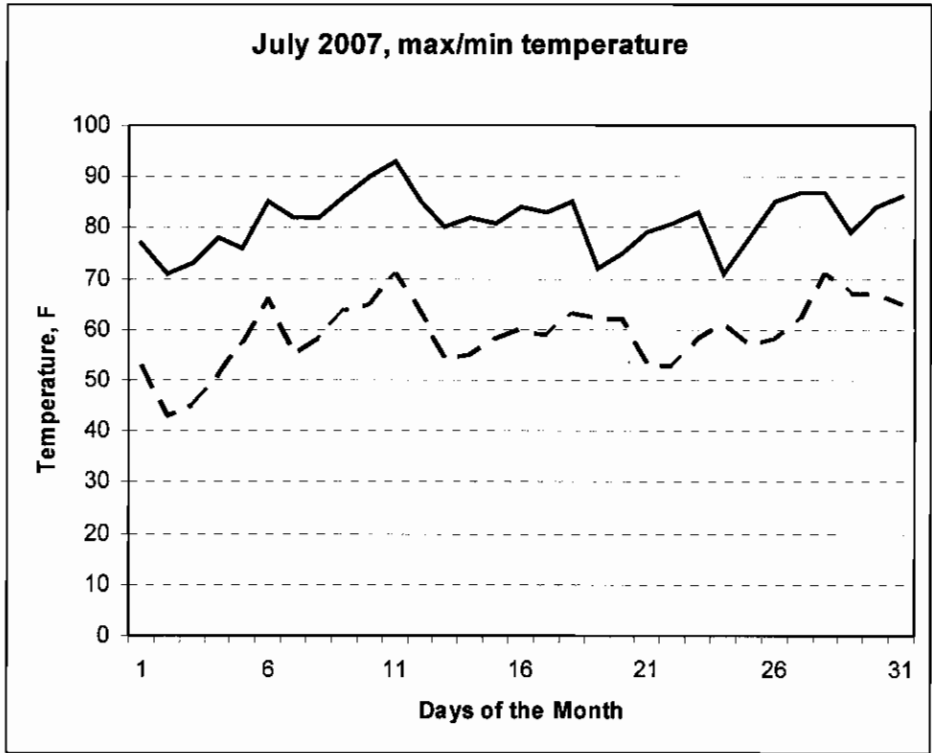
Weather Data

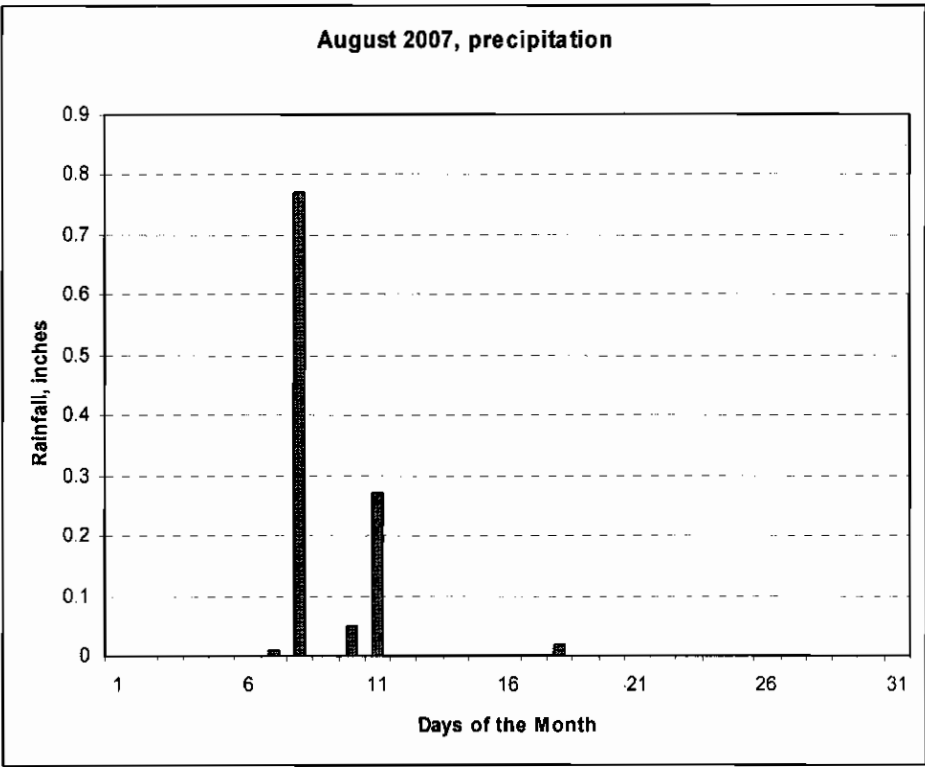
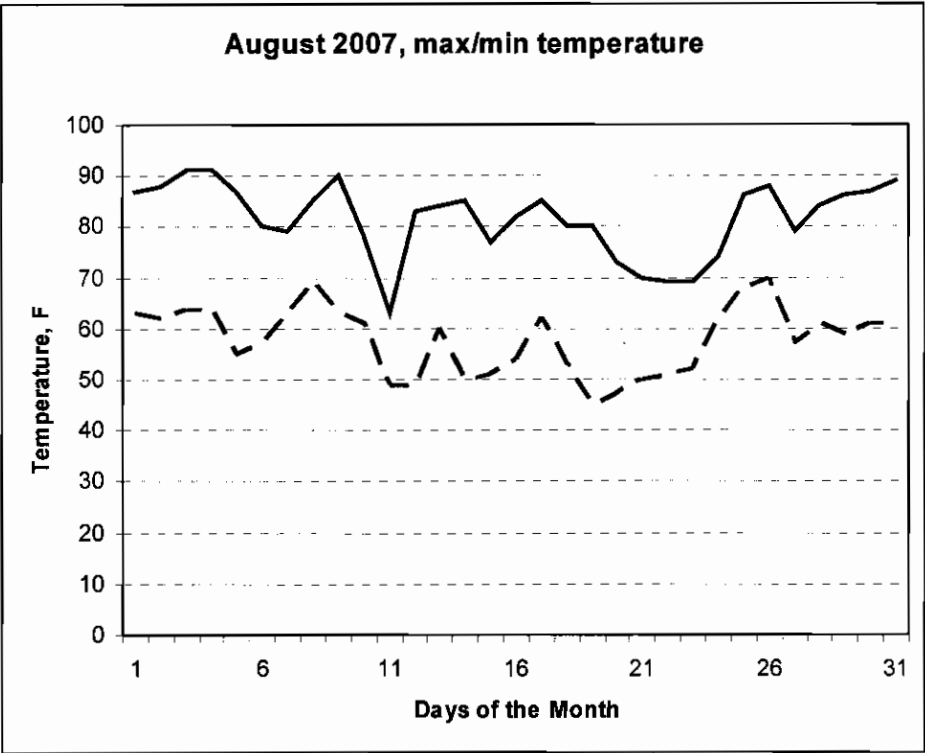
Amherst, MA

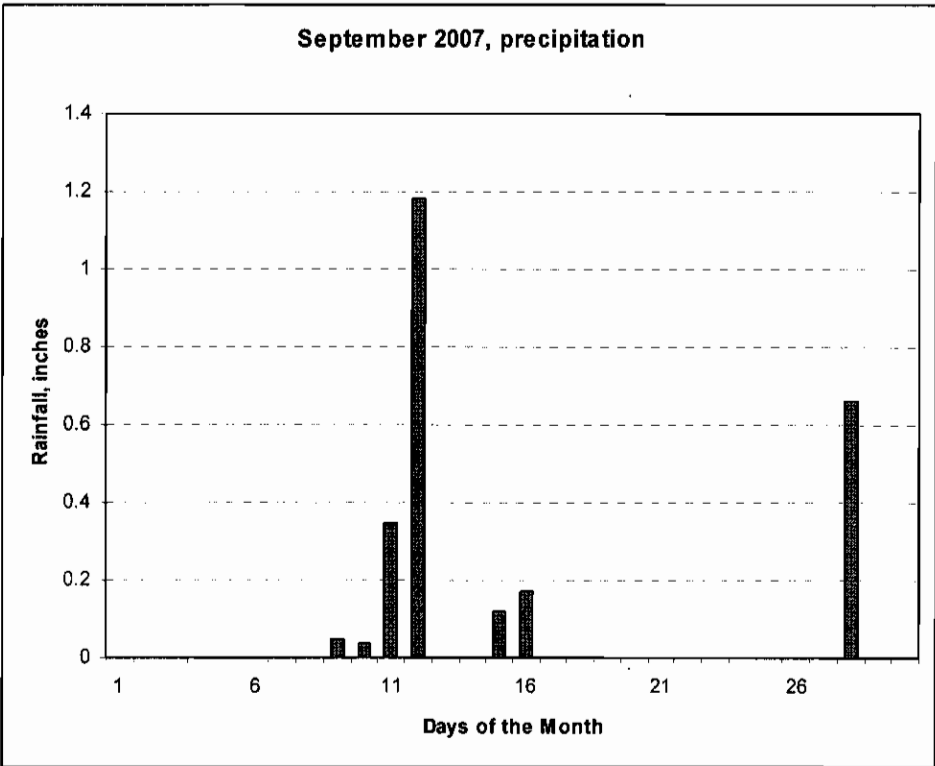
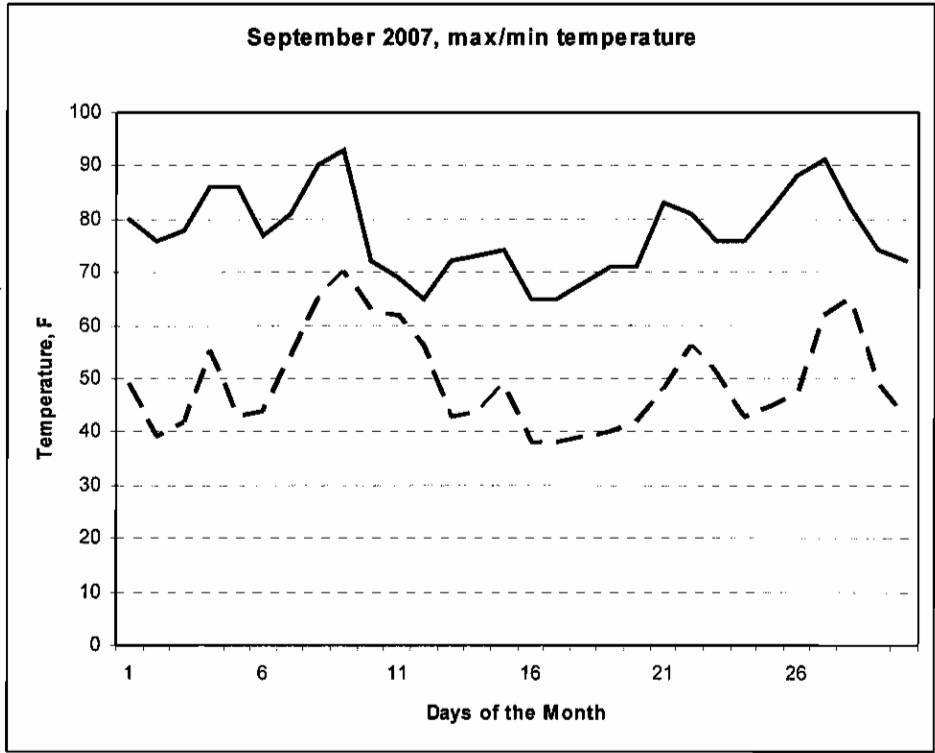


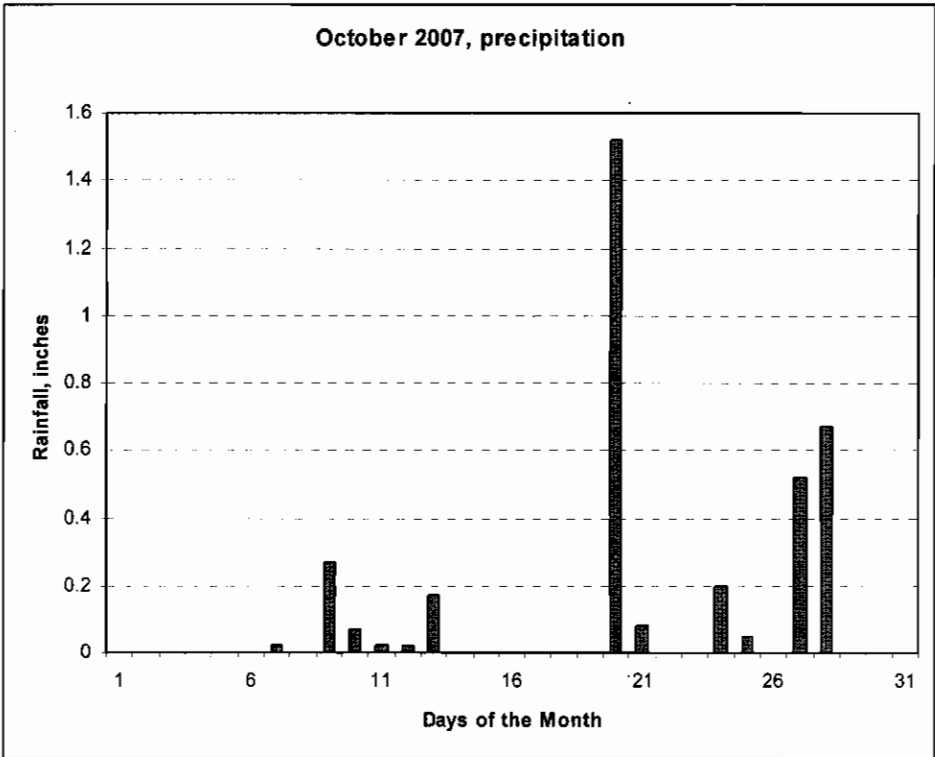
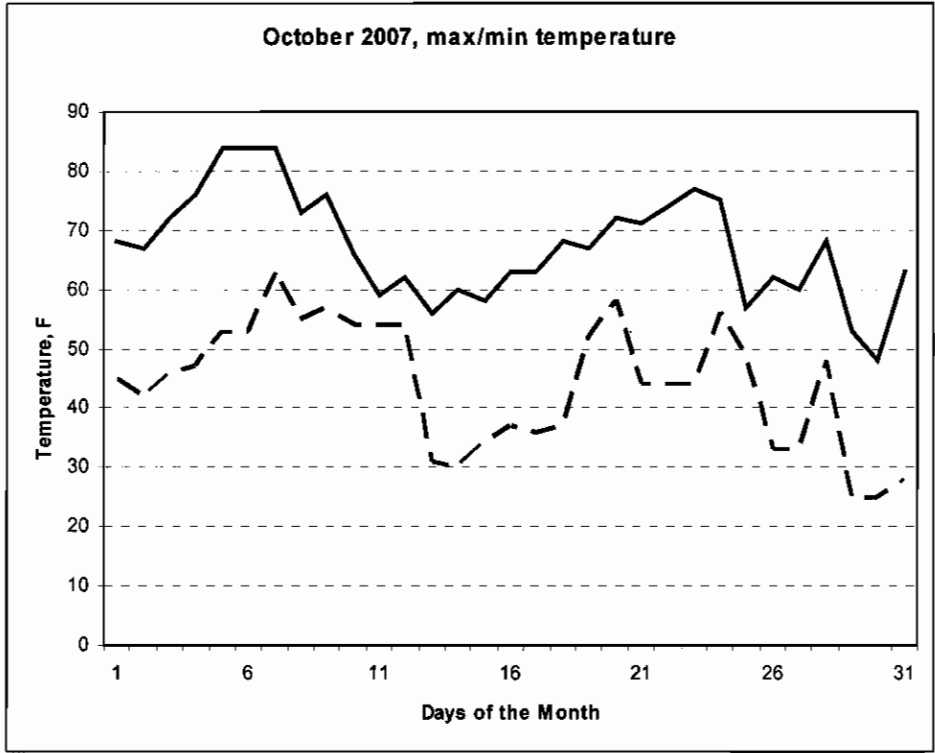












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Bhowmik, P.C. D. Sarkar, N. Tharayil and D. Riego 2006. Evaluation of various formulations of glyphosate in tall fescue. Massachusetts Weed Science Research Results – 2006. Vol. 25:37-40.

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Bhowmik, P.C. and D. Riego. 2006. Yellow nutsedge control with Certainty in mixed cool-season turfgrass. – spray to wet. Massachusetts Weed Science Research Results – 2006. Vol. 25:49-52.

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Last Five Years (2003-2007)
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by

Prof. Prasanta C. Bhowmik

Department of Plant, soil, and Insect Sciences
University of Massachusetts, Amherst, MA 01003

2007

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2006

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