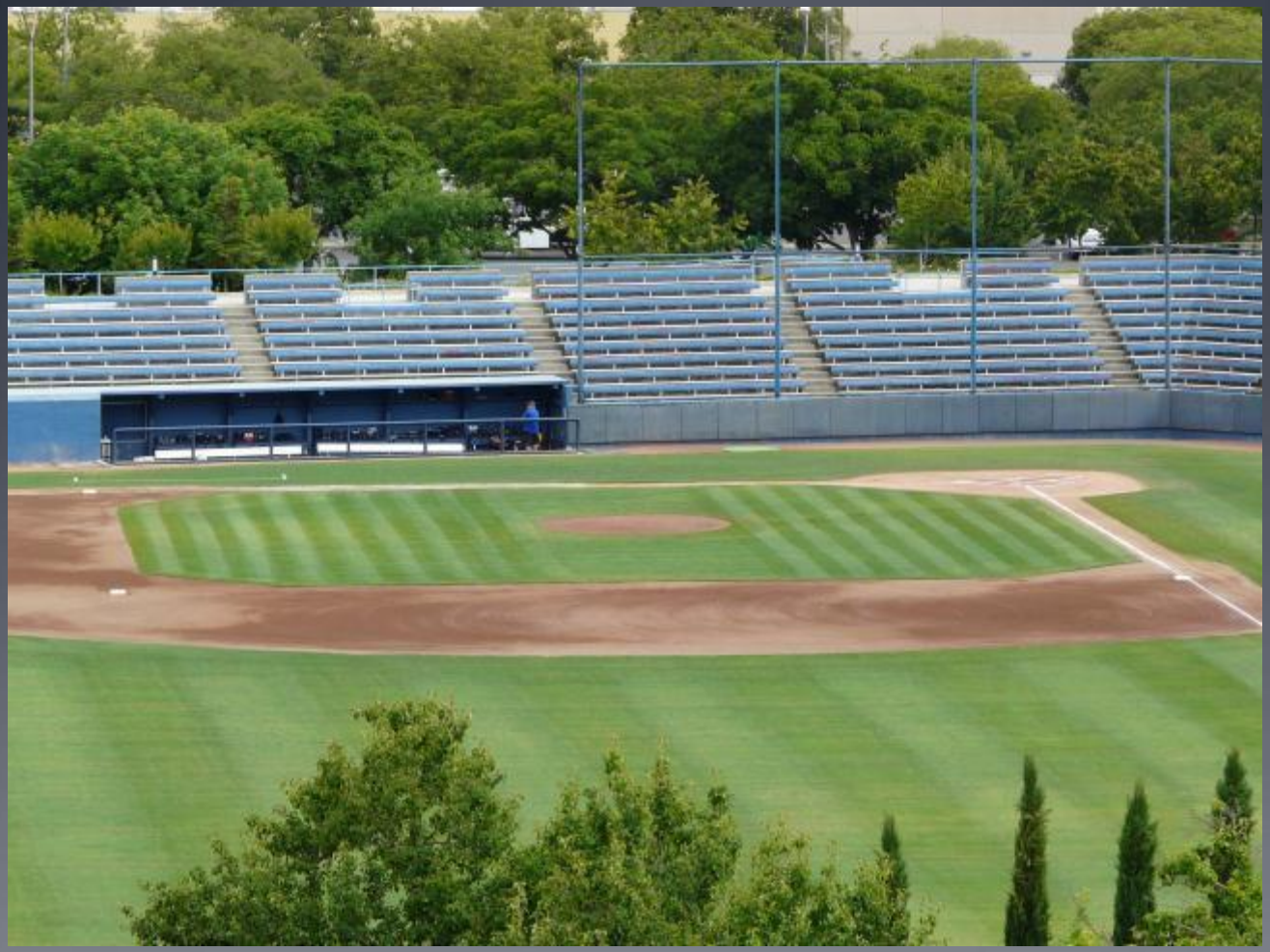
# Economic and Environmental considerations in today's sport turf management

Mark Lucas
Sports Turf Manager
UC Davis

# Current situation

- Reduced materials budget
- Customer expectations
- How can sports turf managers be expected to continue our current level of service ?
- Furloughs, layoffs and time reductions



# Look for hidden resources

- Customer fees
- Customer participation
- Lemons into lemonade


UCDAVIS
Olive Oil
$12

# What is really important ?

- Maintain a safe environment
- Athletes safety and ability to perform
- Aesthetics
- Saving $$$

# Where can we cut ?

- Personnel
- Time
- Materials
- Deferred maintenance

# Cut planting of annual beds

# Defer tree planting

# Reduce logo painting

# Permanent logo painting


THE ARC
GO AGS!

# What can NOT be cut ?

- Essential cultural practices

irrigation, mowing, fertilization, aeration and seeding.

Essential athletic practices:

field painting, managing skinned areas such as infields, home plate, pitchers mound, throwing circles and runways

Required facility sanitation practices:

bleachers , grand stands, bathrooms, entry ways, dug-outs, batting cages, fence repair, vandalism repair and graffiti removal

# How can we trim and still maintain ?

- Fertilization
- Chemical based fertilizers vs organic based
- The UC Davis Hybrid fertility program
- Soil analysis


Native Grass
Meadow
Conversion
in Progress
PLEASE KEEP OFF

# Mowed once annually

Low water use

# Bioswells

Storm water detention basin

# Aeration


TORO

# Reduce topdressing

# Core pulverization

# Topdressing with compost

# Verticutting

# Drop spread edges

# Broadcast seed


385

# Non over seeded field

# Fertilization


410

# ANR ANALYTICAL LABORATORY
## UNIVERSITY OF CALIFORNIA
## COOPERATIVE EXTENSION

http://danranlab.ucanr.org

SUBMITTED BY: LUCAS, MARK
DANR SECTION: RES: GROUNDS DIV, UCD
COPY TO: Not Specified
COMMODITY: Turf

WORK REQ #: 09S250
# OF SAMPLES: 12
DATE RECEIVED: 06/10/09
DATE REPORTED: 07/17/09
DANR CLIENT #: MARL1
TURN AROUND TIME IN WORKING DAYS: 27

Sample Type: SOIL  Date Sampled: July 1 2009; Grower/Location/Project: Not Specified

| SAMPLE # | DESC | pH [SOP 205.02] | EC [SOP 215.02] dS/m | B (SP) [SOP 230.02] mg/L | NO3-N [SOP 312.02] ppm | Olsen-P [SOP 340.02] ppm | X-K [SOP 360.02] ppm | X-K [SOP 360.02] meq/100g | X-Na [SOP 360.02] ppm | X-Na [SOP 360.02] meq/100g | X-Ca [SOP 360.02] meq/100g | X-Mg [SOP 360.02] meq/100g | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dairy | 7.9 | 1.11 | 1.51 | 6.6 | 30.7 | 233 | 0.59 | 211 | 0.92 | 10.57 | 13.21 | |
| 1 dup | | 8.0 | 1.10 | 1.60 | 6.6 | 28.2 | 238 | 0.61 | 211 | 0.92 | 10.44 | 13.13 | |
| 2 | RMI | 8.0 | 0.72 | 1.03 | 0.6 | 11.0 | 151 | 0.39 | 169 | 0.73 | 11.16 | 10.17 | |
| 3 | Hutchison | 7.9 | 1.29 | 1.85 | 19.5 | 25.7 | 305 | 0.78 | 256 | 1.11 | 11.76 | 16.46 | |
| 4 | Stadium | 8.0 | 0.89 | 1.15 | 0.2 | 22.7 | 186 | 0.48 | 196 | 0.85 | 16.92 | 14.07 | |
| 5 | Toomey | 7.4 | 1.29 | 1.78 | 34.1 | 39.9 | 139 | 0.36 | 100 | 0.44 | 5.97 | 5.51 | |
| 6 | Quad | 7.7 | 1.37 | 1.57 | 22.3 | 23.0 | 255 | 0.65 | 197 | 0.86 | 12.95 | 16.43 | |
| 7 | Haward | 7.8 | 1.64 | 2.21 | 19.8 | 53.1 | 221 | 0.57 | 157 | 0.68 | 7.77 | 7.91 | |
| 8 | A St. | 7.9 | 1.43 | 1.58 | 21.4 | 26.0 | 298 | 0.76 | 218 | 0.95 | 12.54 | 12.86 | |
| 9 | Baseball | 7.7 | 1.64 | 2.07 | 32.8 | 70.2 | 303 | 0.77 | 151 | 0.65 | 12.90 | 11.54 | |
| 10 | Russel | 8.0 | 1.18 | 1.92 | 14.2 | 19.9 | 462 | 1.18 | 276 | 1.20 | 16.02 | 26.60 | |
| 10 dup | | 8.0 | 1.18 | 1.90 | 14.4 | 20.7 | 478 | 1.22 | 278 | 1.21 | 16.11 | 26.76 | |
| 11 | Softball | 7.9 | 1.32 | 2.11 | 8.2 | 71.1 | 329 | 0.84 | 238 | 1.04 | 10.54 | 13.98 | |
| 12 | Soccer | 7.4 | 2.40 | 2.24 | 51.0 | 90.7 | 490 | 1.25 | 170 | 0.74 | 13.63 | 11.64 | |
| 12 dup | | 7.5 | 2.40 | 2.25 | 50.9 | 95.0 | 490 | 1.25 | 169 | 0.74 | 13.98 | 11.78 | |
| Analysis Date: | | 7/14/2009 | 7/14/2009 | 7/16/2009 | 6/29/2009 | 6/18/2009 | 7/2/2009 | 7/2/2009 | 7/2/2009 | 7/2/2009 | 6/30/2009 | 6/30/2009 | |
| Method Detection Limit: | | 0.1 | 0.01 | 0.05 | 0.1 | 1.0 | 1 | 0.01 | 1 | 0.01 | 0.01 | 0.01 | |
| Blank Concentration: | | - | - | 0.00 | 0.0 | 0.0 | 0 | 0.00 | 0 | 0.00 | 0.00 | 0.00 | |
| Standard Ref as Tested: | | 6.44 | 0.28 | 0.35 | 68 | 35.5 | 1039 | 2.7 | 49.8 | 0.22 | 22.6 | 9.7 | |
| Standard Ref Acceptable: | | 6.45±0.06 | 0.28±0.02 | 0.34±0.02 | 68±6 | 39.1±8.0 | 1053±80 | 2.7±0.2 | 50.0±4.0 | 0.22±0.02 | 20.6±4.0 | 8.9±1.2 | |
| Standard Reference: | | UCD 004 | UCD 006A | UCD 006A | NORD | NORD | NORD | NORD | HELENA | HELENA | NORD | NORD | |

**NOTE:** The SOP # (Standard Operating Procedure number) is a reference to the laboratory method used.
The SOP heading in this Excel file is linked to the method summary on the Laboratory website. http://danranlab.ucanr.org

**NOTE:** No result within this report is accurate to more than 3 significant figures. More figures may be present due to software rounding rules.

Checked and Approved: *[electronically signed by Traci Francis]*
Traci Francis, Laboratory Supervisor

Reviewed and Approved: *[electronically signed by Dirk Holstege]*
Dirk Holstege, Director

**Please address questions regarding these results to Lab Director Dirk Holstege at (530) 752-0148 or dmholstege@ucdavis.edu.**

# Water Analysis Report

| | | | |
|---|---|---|---|
| *Job Name* | UC Davis | *Company* | Soil First Consulting |
| *Contact* | | *Sample ID* | 49274 |
| *Rep* | Sierra Pacific Turf | *Lab Number* | 1954 |
| *Submitted By* | Roberts, Jeff | *Run Date* | 9/9/2008 |

*Sample Location* Water
*Sample Name*

*Notes*

| | | |
|---|---|---|
| *pH* | | 7.7 |
| *Hardness* | *ppm* | 415.4 |
| *Hardness Grains* | */gal* | 24.29 |
| *Conductivity* | *mmhos/cm* | 0.88 |
| *Sodium Absorbtion Ratio* | | 0.73 |

| | | *ppm* | *MEQ/L* | *lbs/A IN* |
|---|---|---|---|---|
| *Calcium* | *Ca* | 52 | 2.60 | 11.83 |
| *Magnesium* | *Mg* | 69.3 | 5.78 | 15.76 |
| *Potassium* | *K* | 0.9 | 0.02 | 0.21 |
| *Sodium* | *Na* | 39.1 | 1.70 | 8.89 |
| *Iron* | *Fe* | 0 | | 0.01 |

| | *ppm* | *MEQ/L* | *lbs/A IN* |
|---|---|---|---|
| *Total Alkalinity* | 478.0 | | 108.64 |
| *Carbonate* | 0.0 | 0.00 | 0.00 |
| *Bicarbonate* | 649.0 | 10.64 | 147.50 |
| *Chloride* | 19.0 | 0.54 | 4.32 |
| *Sulfate* | 123.2 | 2.58 | 28.01 |
| *Salt Concentration* | 566.4 | | 128.73 |
| *Boron* | 0.53 | | |
| *Cation/Anion Ratio* | | 0.73 | |

# Deep water wells

# SOIL FIRST
CONSULTING

August 22, 2008

To: UC Davis

From: Jim Heck, Joel Simmons

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Despite the significance of the colloidal calcium deficit in this ***Soccer*** field root zone, the excesses of magnesium and potassium are responsible for the unusual level of alkalinity. This soil is not only calcium deficient, but indicates an increased level of concern with respect to the very high magnesium level in comparison to calcium. ***This sort of Ca: Mg imbalance,*** on heavier mineral soils in particular, will lead to very 'tight' soil physical conditions that will have a negative influence on air and water exchange. In this particular profile however, incorporation of the limestone will need to be worked out, since improving that very weak colloidal calcium reserve will physically improve soil aggregation and eventually help the excess sodium (and sulfur) flush more readily through the profile with good soil water movement – assuming good drainage is in place! But since lime alone will usually not be a sufficient calcium source to provide adequate calcium to replace the sodium, especially if sodium is continuously added through irrigation (these tests results indicate a clear need to test your irrigation water), an additional need is clearly established for the frequent need of gypsum in the program to further facilitate this exchange process. Where sub-surface compaction, clay accumulations, hydrophobic zones and/ or layering are also contributing to poor percolation rates (and the accumulation of these excess salts), a consistent strategy of multiple forms of aerification would need to be implemented for enhanced rates of water infiltration and percolation to remove those excess salts, and to further promote better root zone physical properties for healthy root development and the prevention of anaerobic soil conditions. As far as impairments to nutrient availability when drainage problems exist; compaction can reduce K uptake by 60-70 % because physically tight soils will negatively impact rates of diffusion (the primary mechanism for K movement to root surfaces). Potassium and calcium inputs have to be pushed harder to compensate, as will phosphorus when soil water content is low and physical compaction of the soil increases and root elongation is inhibited.

Phosphorus availability restrictions could be especially problematic if this site is poorly drained or saturated for extended periods of time because those soil bacteria populations that make phosphorus plant available cannot survive in such an environment. Since the colloidal P reserve is more than sustainable, a well oxygenated soil with good biological activity and rates of organic matter digestion will provide the best environment for enhanced mobility.

[illegible] with any questions

# Nutrient Analysis

Pierce County has their bio-solids tested by a commercial lab, currently AmTest Laboratories, monthly to ensure that it is continually meeting standards for quality and safety. One of the benefits of an organic fertilizer is that it contains micronutrients that are beneficial and essential to plant growth. SoundGRO™ is guaranteed to have the following nutrients concentrations:

| Nutrient | Quantity |
|---|---|
| Total Nitrogen | 5.0% |
| *water insoluble nitrogen* | 3.5% |
| *water soluble nitrogen* | 1.5% |
| Available Phosphate (P2O5) | 4.0% |
| Calcium (Ca) | 3.0% |
| Magnesium (Mg) | 0.90% |
| Iron (Fe) | 0.55% |
| Molybdenum (Mo) | 0.0010% |
| Zinc (Zn) | 0.05% |

One concern associated with using bio-solids as fertilizer is with possible heavy metal content. In 1993, after over 20 years of extensive research, the EPA adopted the 40 CFR Part 503 which states standards for safe heavy metal concentrations in bio-solids. SoundGRO™'s heavy metal concentrations are consistently below the EPA's standards.

| Heavy Metal | Pierce County's Bio-solid Heavy Metal Concentration Averages 2005 (ppm) | EPA's Standards for Class A 'Exceptional Quality' Bio-solids (ppm) |
|---|---|---|
| Arsenic | 3.1 | 41 |
| Cadmium | 5.1 | 39 |
| Mercury | 1.0 | 17 |
| Molybdenum | 21.1 | 75 |
| Nickel | 3.0 | 420 |
| Lead | 21.2 | 300 |
| Selenium | 6.1 | 100 |
| Zinc | 1005.8 | 2800 |
| Chromium | 26.8 | 1200 |
| Copper | 543.7 | 1500 |

100% NATURAL ORGANIC FERTILIZER

# Nutri-Rich 8-2-4

## Environmentally Friendly – High Performance – Low Impact

100% Natural Organic Fertilizer – Nutri-Rich offers the most natural source of essential nutrients to promote vigorous plant growth, bountiful yields and brilliant flowering. Nutri-Rich is completely natural and contains no synthetic ingredients. Used as directed, Nutri-Rich will not impact or harm ground waters or other sensitive ecosystems. In fact, regular use of Nutri-Rich will not only build up and enrich soil but also benefit the plant and soil biosphere.

## Gradual and Steady Release of Nutrients

Nutri-Rich is formulated with a broad spectrum of nutrients that slowly release as a plant needs them. The result is a longer lasting green, a stronger and robust shoot and root system, and flowering and fruiting beyond compare.

## Exceptional Quality, Consistency, & Confidence

Nutri-Rich is processed with quality and consistency in mind. Formulated into a uniform pellet and granule, every piece of Nutri-Rich contains the same nutrients necessary for optimum plant nutrition. Many synthetic fertilizers are blended from multiple ingredients supplied by multiple manufacturers. You can have confidence that Nutri-Rich only contains the most natural plant food that Mother Nature ever intended.

## Easy to Use

While some meal from fertilizers offer similar individual nutrient values, applying the material may be prohibitive because of special equipment requirements. Nutri-Rich is the next generation in natural 100% organic fertilizers and can easily be applied with any conventional fertilizer spreader. Nutri-Rich will evenly broadcast for complete coverage on turf or garden plots. The density and sizing allow for each particle to immediately settle into the soil and begin feeding your plants the moment your broadcasting is complete.

### Minimum Guaranteed Analysis

| | |
|---|---|
| Total Nitrogen (N): | 8% |
| 1% Water Soluble Organic Nitrogen | |
| 7% Water Insoluble Organic Nitrogen | |
| Available Phosphate ($P_2O_5$) | 2% |
| Soluble Potash ($K_2O$) | 4% |

Derived from: Dried Poultry Waste, Blood Meal, Feather Meal, Sulfate of Potash.

Information regarding the contents and levels of metals in this product is available on the Internet at http://www.aapfco.org/metals.html

Please Store Unused Nutri-Rich Fertilizer in a Dry Environment

Please visit our website at www.stutzman-environmental.com for information about our other organic fertilizer products or our line of premium pet care products.

100% NATURAL ORGANIC FERTILIZER

# Controlling growth

- Plant growth regulators

# PGR Applications

- Athletic field painting
- Entire field application
- Edge only application
- Other turf areas

# Paint durability test

# Second week


UCDAVIS


AGGIE STADIUM
Coca-Cola
UC DAVIS
HEALTH SYSTEM
at&t
AGGIE
PRIDE
QTR
DOWN
TO GO
BALL ON

# Edging

# PGR Benefits

- Reduced field painting > $$$
- Reduced mowing > $$$
- Reduced edging > $$$
- Improved traffic tolerance
- Improved turf vigor with less vertical growth
- Increased root development
- Darker turf color

# Savings on materials

Less storage needed, lower volume shipping, no VOC's, longer shelf life

# Increased efficiency

# fertilizer hopper


GATOR


244E
JACOBSEN
OHN DEERE

# Infield topdressing

# Shopping locally

# Integrated pest management

*Steinernema*

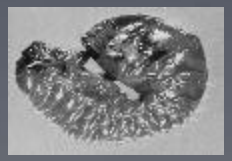
*Heterorhabditis*

**IJs penetrate into the host**

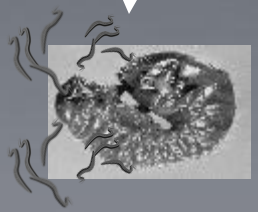
**Release of bacteria, host death, development**



**1st adult generation**

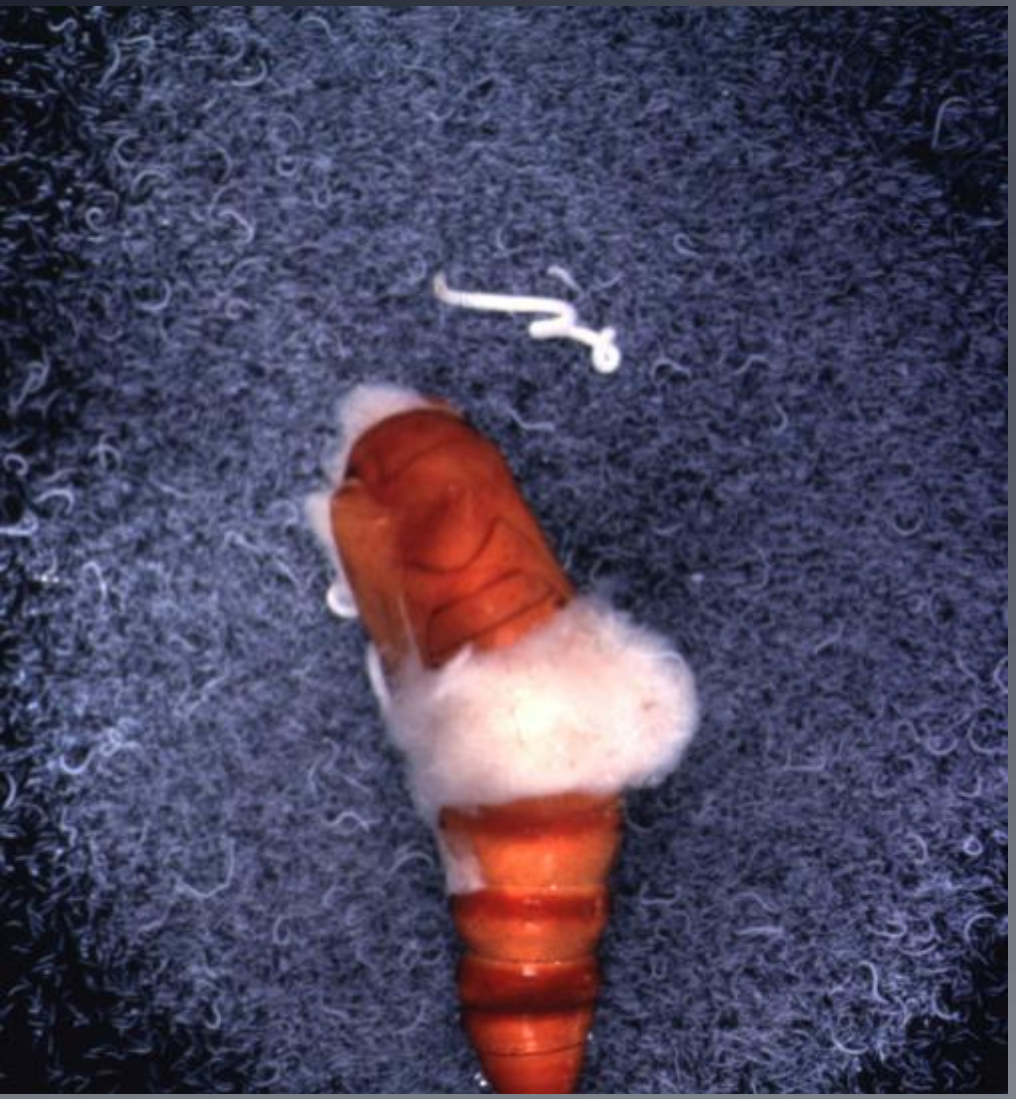


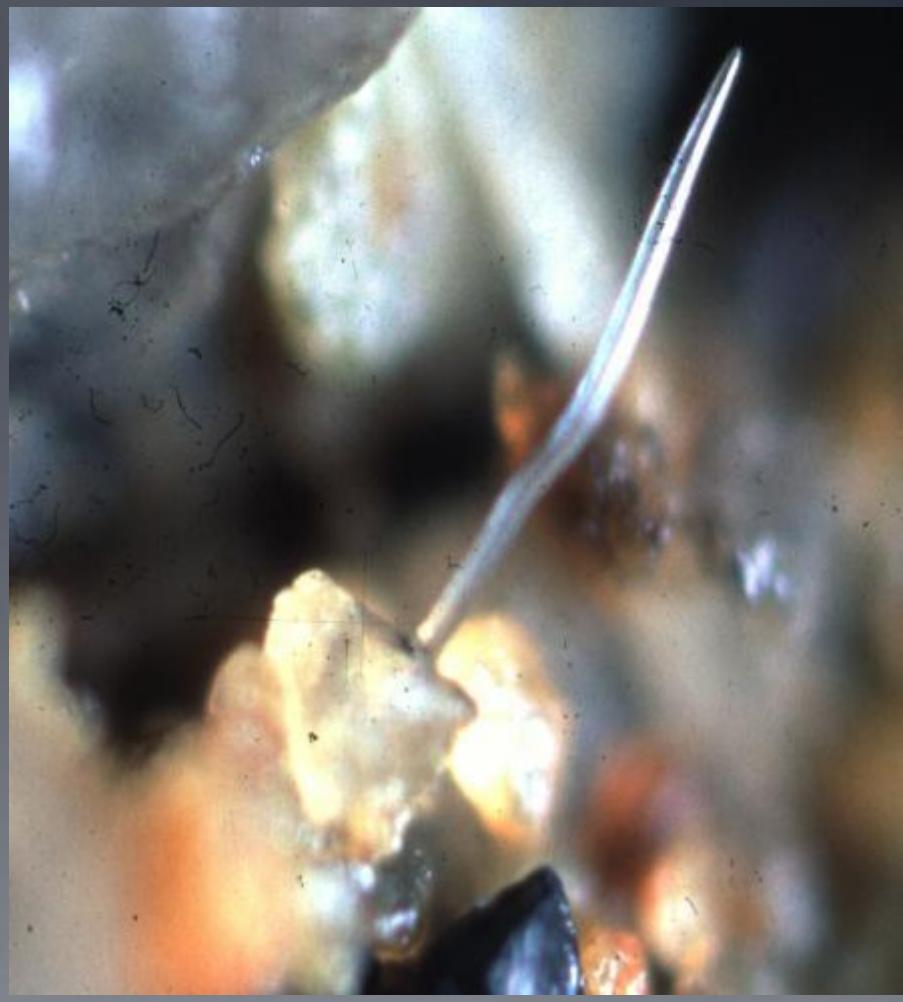
**Reproduction and development**
**(0-2 additional generations)**



**IJ production and emergence**

**IJ host finding:**
**ambush, intermediate, or cruise foraging**





# Less pesticide use

# May your grass always be green


# Thank you. Questions?