



# Biostatistics Laboratory Activities

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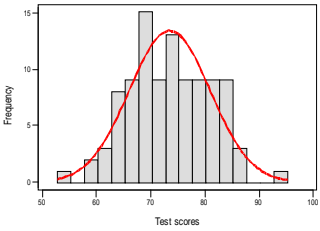
Belmont University

Nashville, TN

Joint Statistics Meeting

Baltimore, Maryland

August 9, 1999

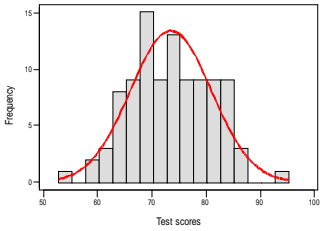


# Biostatistics Laboratory Activities



## OUTLINE

- **Course Overview**
- **3 Biostatistics Laboratory Activities**
  - **Cicada Data**
  - **Is it Poisson?**
  - **Does Radiation Affect Growth of Oats?**



# Biostatistics Laboratory

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- **Hands-on Approach**
- **Data Collected From Biology Experiments**
- **Students Analyze Data & Report Findings**



# Cicada Data

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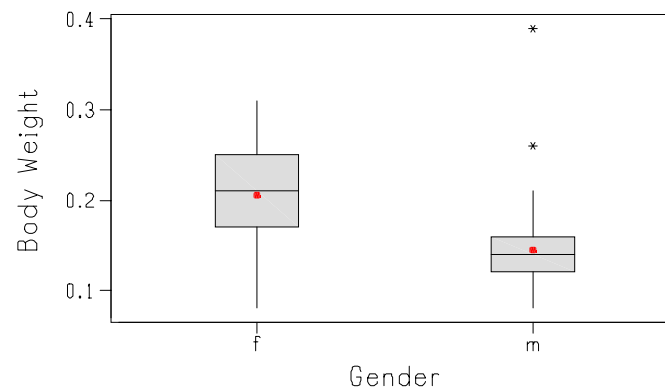
- **Forming Hypotheses**
- **Collecting Data**
- **Taking Measurements**
- **Analyzing Data**

# Cicada Data -- Let's Analyze It



- **Measures of Center**
- **Measures of Spread**
- **Graphical Representations**

Boxplots of Body Weight by Gender



# Cicada Data - A Reoccurring Theme

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- **Hypothesis Testing**
  - **Checking Assumptions**
  - **Gender Differences?**



**Gender**



# Cicada Data - A Reoccurring Theme

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- **One-Way ANOVA**
  - Post Hoc Tukey Test
- **Two-Way ANOVA**

**Species**





# Is it Poisson?



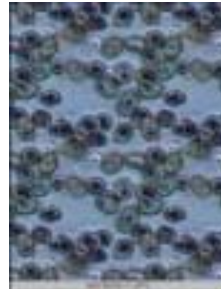
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- **The Experiment**

- Does the frequency of yeast cells per box represent a Poisson Distribution?

- **The Results**

- Mixed conclusions with valid explanations.

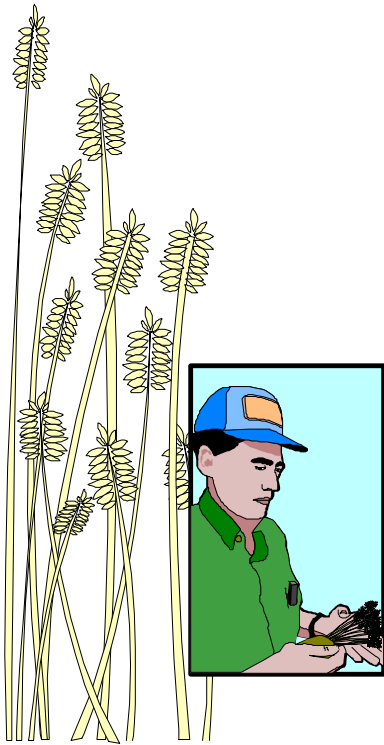


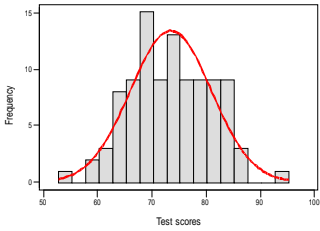


# Does Radiation Affect the Growth of Oats?



- **The Experiment**
  - **Purchase Radiated Seeds**
  - **Plant & WATER seeds**
  - **Measure**
    - **Germination Rates**
    - **Height of Oats**
    - **Growth over time**





# Conclusions



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- **Better Preparation for Biology Research**
  - **Improved Ability to Make Applications in Biology Context**
  - **Increased Long Term Memory of Statistics ?**
  - **It is a lot of FUN!**