

# Traps

PMA 4570/6228

# Traps

- Monitoring
  - Left out in the field for a period of time, then the number of insects is counted
- Attractive or passive
  - Color (visual), pheromones (olfactory), and food (olfactory) are common attractants
- Examples
  - Sticky traps (cards)
  - Wing traps
  - Bucket traps
  - Pan traps
  - Pitfall traps

# Sticky Traps (Cards)

- Attractive and passive
  - Different colors attract different insects
  - Also catches anything that flies into it
- Advantages
  - Easy to deploy, collect, and check
- Disadvantages
  - Can be blown down
  - \$1.30 per trap



- Examples
  - White traps for thrips
  - Yellow traps for aphids, whiteflies, and beneficials

# Wing Traps



- Used to monitor
  - Adult Lepidoptera
- Attractive and passive
  - Pheromone lure
  - Also catches anything that flies into it
- Advantages
  - Relatively inexpensive
  - Easy to deploy
- Disadvantages
  - Must be replaced periodically throughout the season
  - Can be damaged by weather

# Bucket traps



S. Weihman, UF

- Used to monitor
  - Adult Lepidoptera
- Primarily attractive
  - Pheromone lure
  - Color
  - No pest strip can be used so insects die quickly
- Advantages
  - Reusable
  - Sturdy
  - Easy to deploy and check
- Disadvantages
  - Initial cost is high

# Pan Traps

- Attractive and passive
  - Color
  - Soapy water will kill any insect that lands in it
- Advantages
  - Inexpensive
  - Can last for several seasons (with maintenance)
  - Easy to check
- Disadvantages
  - Easy to spill when collecting samples
  - Labor intensive to deploy



- Examples
  - Blue pan traps for aphids

# Pitfall traps

- Passive
  - Catches and kills whatever falls into it
- Advantages
  - Inexpensive
  - Can last for several seasons (with maintenance)
  - Easy to check
- Disadvantages
  - Dirt/mud in samples
  - Labor intensive to deploy



- Used to sample
  - Ground beetles

# Basic Statistics



# Quick overview of descriptive stats

- Measures of central tendency
  - The center of the distribution of measurements
- Measures of dispersion
  - How the measurements vary about the center of the distribution

Ott and Longnecker 2004

**“There are three kinds of lies: lies, damned lies, and statistics.”**  
**Benjamin Disraeli (1804-1881)**

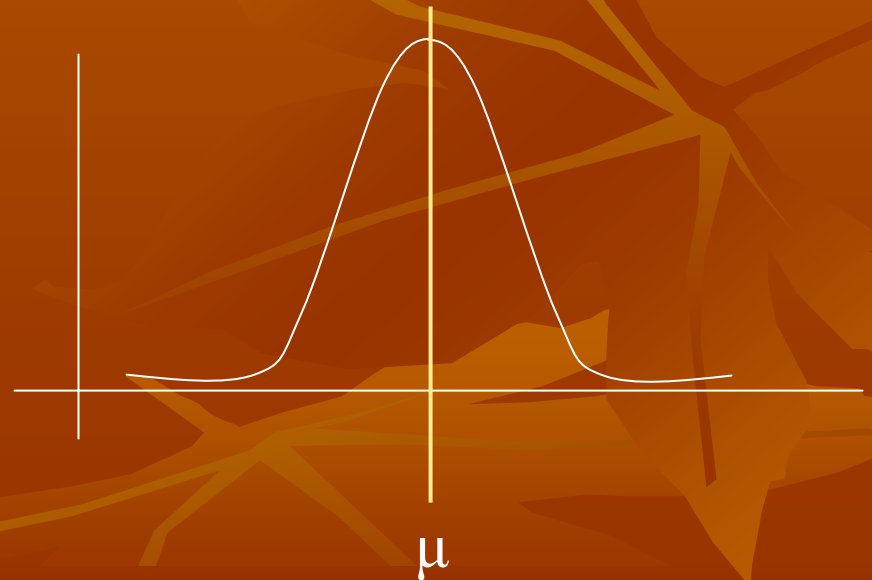
**“A single death is a tragedy; a million deaths is a statistic.”**  
**Joseph Stalin (1879-1953)**

**“USA Today has come out with a new survey - apparently, three out of every four people make up 75% of the population.”**  
**David Letterman (1947 - )**

# Quick overview of descriptive stats

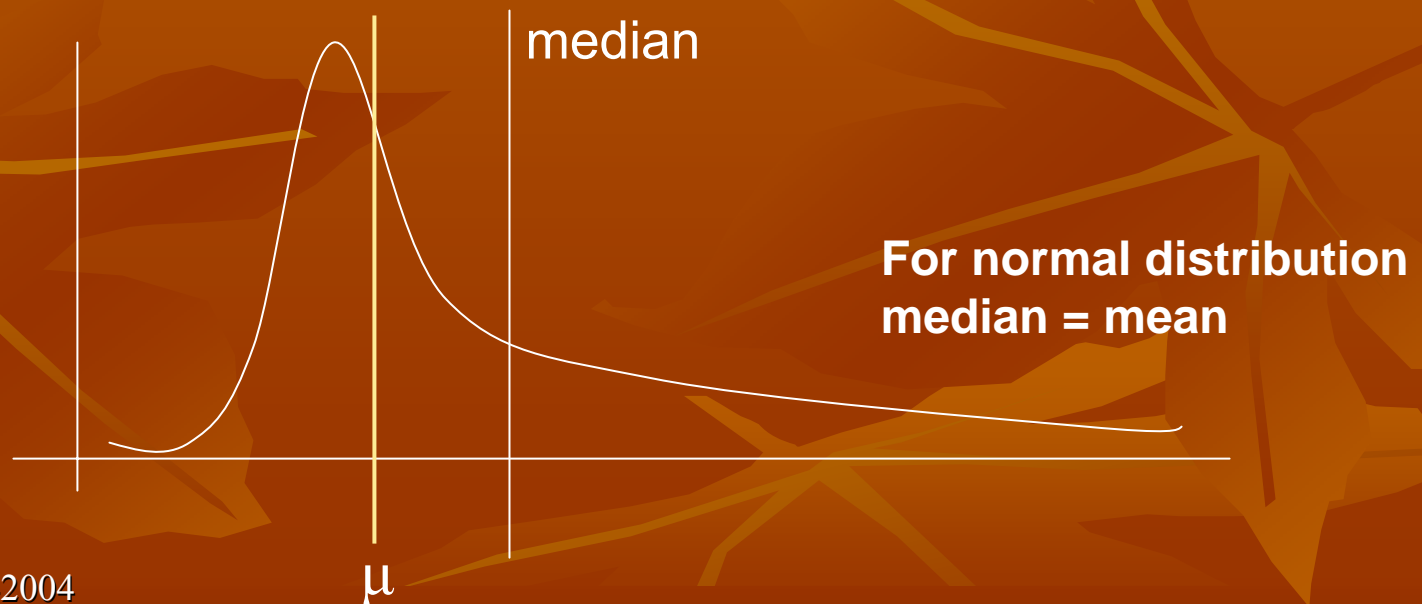
- Measures of central tendency
  - **Mean**: a value that is computed by dividing the sum of a set of terms by the number of terms

$$\mu = \frac{\sum_{i=1}^n y_i}{n}$$



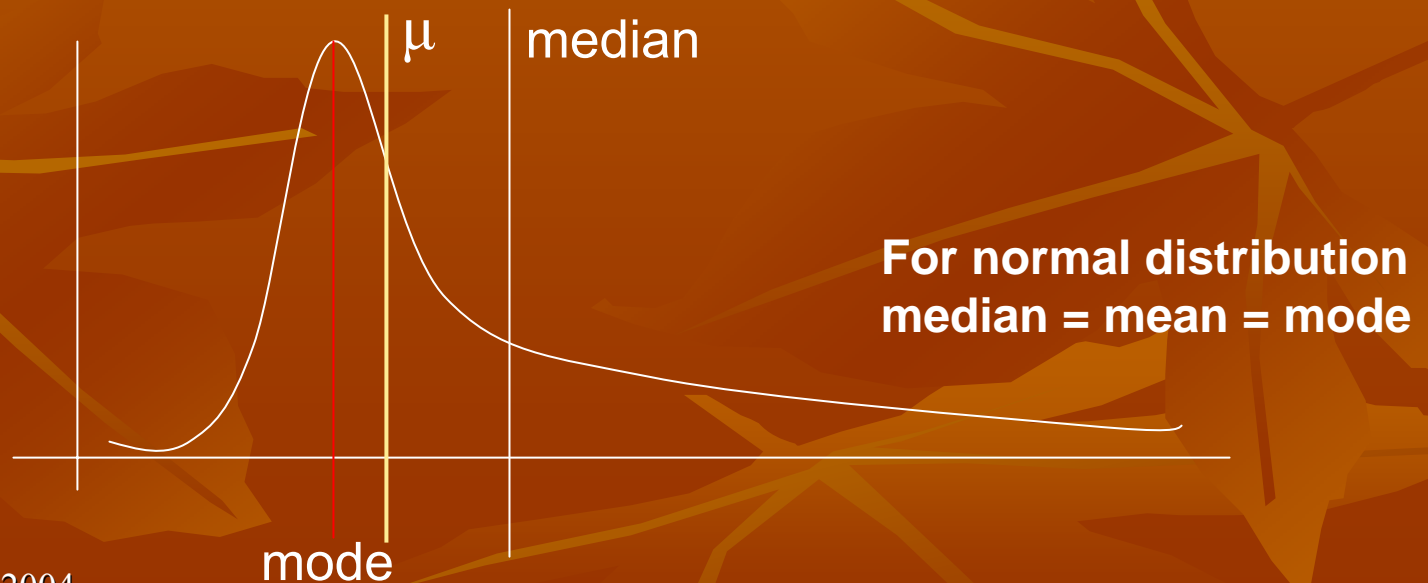
# Quick overview of descriptive stats

- Measures of central tendency
  - Mean
  - **Median**: the number in the center of a data set
    - if data set is odd - the number in the middle
    - If data set is even – the mean of the two middle numbers



# Quick overview of descriptive stats

- Measures of central tendency
  - Mean
  - Median
  - **Mode**: is the value that occurs most frequently in a set of data



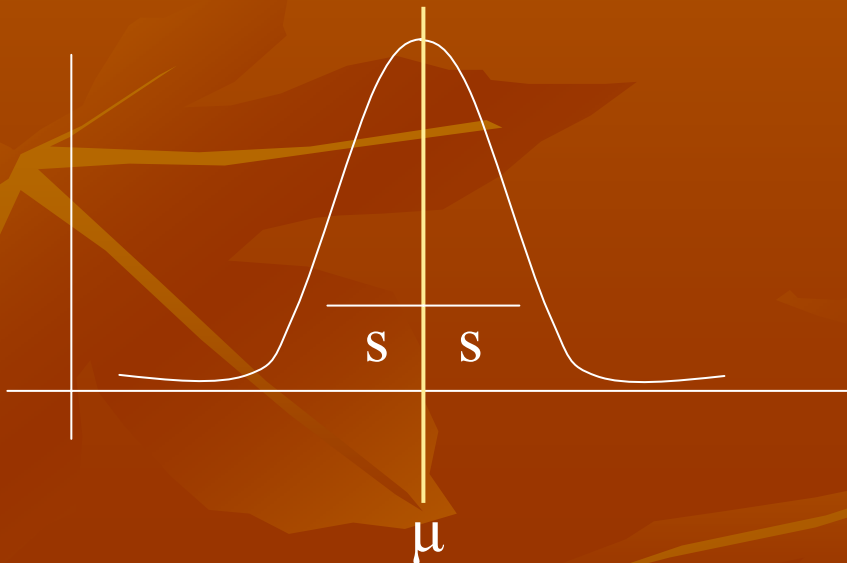
# Quick overview of descriptive stats

- Measures of dispersion
  - **Variance**: the average of the square of the difference between the observation and the mean

$$s^2 = \frac{\sum_{i=1}^n (x_i - \mu)^2}{n - 1}$$

# Quick overview of descriptive stats

- Measures of dispersion
  - Variance
  - **Standard deviation**: The standard deviation is a measure of how widely values are dispersed from the average value (the mean).



1s = 68.3% data

1.645 s = 95% = C.I. 95

# Quick overview of descriptive stats

- Measures of dispersion
  - Variance
  - Standard deviation
  - **Standard Error of the Mean:** is an estimate of the standard deviation of the sampling distribution of means, based on the data from one or more random samples.

$$S.E.M = \frac{s}{\sqrt{n}}$$

# Example

trap	Aphids
1	20
2	16
3	12
4	27
5	32
6	15
7	9
8	12
9	22
10	13
11	27
12	48
13	37
14	21
15	29
16	19
17	11
18	26
19	33
20	31

**Mean** =  $(20 + 16 + 12 + 27 + 32 + 15 + 9 + 14 + 22 + 13 + 27 + 48 + 37 + 21 + 29 + 19 + 11 + 26 + 33 + 31) / 20 = 23.1$

**Median**

(9, 11, 12, 13, 14, 15, 16, 19, 20, 21, 22, 26, 27, 27, 29, 31, 32, 33, 37, 48)

=  $(21 + 22) / 2 = 21.5$

**Mode** = 27



# Example

$$\text{Variance} = \{(20 - 23.1)^2 + (16 - 23.1)^2 + (12 - 23.1)^2 + (27 - 23.1)^2 + (32 - 23.1)^2 + (15 - 23.1)^2 + (9 - 23.1)^2 + (14 - 23.1)^2 + (22 - 23.1)^2 + (13 - 23.1)^2 + (27 - 23.1)^2 + (48 - 23.1)^2 + (37 - 23.1)^2 + (21 - 23.1)^2 + (29 - 23.1)^2 + (19 - 23.1)^2 + (11 - 23.1)^2 + (26 - 23.1)^2 + (33 - 23.1)^2 + (31 - 23.1)^2\} / (20 - 1) \approx \mathbf{101.5}$$

$$\text{Standard Deviation} = \sqrt{\text{variance}} \approx \sqrt{101.5} \approx \mathbf{10.1}$$

$$\text{Standard Error of the Mean} = \text{standard deviation} / \sqrt{n} \approx 10.1 / \sqrt{20} \approx \mathbf{2.3}$$