

2014 Student Research and Creative Endeavor Symposium PREPARATION WORKSHOPS IPFW Learning Commons, Helmke Library

Learn the process of translating your research or creative endeavor to a poster format

Thurs, Jan. 30 @ 2pm
LB 275
Prof. Punya Nachappa
Prof. Ryan Yoder

Wed, Feb. 5 @ noon
Learning Commons
Prof. Mohammad Alhassan
Prof. Steven Stevenson

Free Pizza!

Effects of Drought Stress on Population Growth Rate of an Insect Pest, Soybean Aphid (*Aphis glycines* Matsumura)
Christopher Coffin, Vamsi Nelan, Punya Nachappa
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I. Background
Soybean (*Glycine max*) is a worldwide crop due to its versatility as a food source as well as various applications in industries such as fuel and textiles (Pruitt). In 2012, Indiana farmers planted 4.4 million acres of soybeans, contributing 1.8 billion US dollars to the state economy (5).

II. Methods
Plant and Insect Sources
Soybean variety (1010) was used for all experiments. Soybean aphids were obtained from Purdue University West Lafayette.
Plants were grown at 100% relative humidity, temperatures were maintained at 25°C with a photoperiod of 16L:8D (16h:8h).
Drought Stress: Plants were subjected to drought stress by withholding water for 14 days. The treatments were four levels of soil water content (SWC): 30, 20, 10, and 0% SWC (ANCOV, P < 0.0001) (Fig. 1).

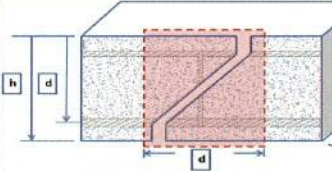
III. Results (cont.)
Aphid populations were highest at day 7 compared to other days (ANCOV, P < 0.0001) (Fig. 2).
Aphid populations were highest at SWC of 20% followed by 30%, 10%, and 0% SWC (ANCOV, P < 0.0001) (Fig. 3).

Regions with tensile stresses: shear and/or bending. The ACI 318 ignores the tensile strength of concrete. The code uses a small value for the shear strength of concrete in locations with high shear. The main objective of this study is to design a method for using fibers to reduce congested shear regions in reinforced concrete beams. In addition, the study aims to determine the contribution of synthetic fibers to the tensile strength of concrete beams. The formula available in ACI 318 for the design of shear in reinforced concrete beams of different fiber content is given below.

| Step 6 | Step 7 | Step 8 | Step 9 | Step 10 | Step 11 |
|-------------------------------|----------------------------------|----------------------------|------------------------------|-------------------------|---|
| Fiber Area (in ²) | Tensile Strength of Fibers (ksi) | Fiber Shear Strength (ksi) | Fiber Orientation Factor (%) | Fiber Efficiency Factor | VF (k Method) - Fiber Contribution to Shear (kip) |
| 0.00 | 89.9 | 0.0 | 0.3 | 0.3 | 0.000 |
| 0.17 | 89.9 | 34.9 | 0.3 | 0.3 | 1.142 |
| 0.33 | 89.9 | 28.9 | 0.3 | 0.3 | 2.082 |
| 0.50 | 89.9 | 44.7 | 0.3 | 0.3 | 4.025 |
| 0.66 | 89.9 | 38.6 | 0.3 | 0.3 | 5.366 |
| 0.83 | 89.9 | 24.3 | 0.3 | 0.3 | 6.706 |
| 1.00 | 89.9 | 38.4 | 0.3 | 0.3 | 8.050 |
| 1.16 | 89.9 | 30.3 | 0.3 | 0.3 | 9.391 |
| 1.33 | 89.9 | 13.3 | 0.3 | 0.3 | 10.733 |

Spacing of Strips
- No Strips
- 4" Spacing
- 6" Spacing

Amount of Fibers
- No Fibers
- 5 Byd¹
- 7 Byd¹



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Male and Female Mice Show Similar Navigation Performance in Darkness
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Introduction
Most species navigate in darkness. Mice show sex and age differences in navigation performance. Males and females differ in navigation performance.

Aim
Determine whether there is a sex difference in navigation performance in darkness.

Method
Use the C57BL/6J mice in a dark environment. Measure the time to reach the goal box.

Results
Latency to Reach Goal Box: Males (red) and Females (blue) show similar performance. Total Block: F(1,24) = 58, p = .47. Trial Block: F(4,24) = .71, p = .56. Group x Trial Block: F(4,24) = .58, p = .58.

Errors During Journey: Males (red) and Females (blue) show similar performance. Total Block: F(1,24) = 1.82, p = .15. Trial Block: F(4,20) = .32, p = .86.

Conclusion
There were no significant differences in navigation performance between males and females. Further studies determine if sex differences exist in other non-vision tasks.

References
1. Balaban Ramsey, (2010). Cued and sex-specific navigation in the mouse. *Neurosci Biobehav Rev*, 34, 148-151.
2. Galloway, L. A. M., K. S. P. Lewis, D. H. M. Sexually dimorphic navigation in the mouse. *Neurosci Biobehav Rev*, 34, 148-151.
3. Jonasson, Z. (2010). Differences in navigation performance between sexes. *Neurosci Biobehav Rev*, 34, 148-151.

Submit a proposal for the March 28 symposium at ipfw.edu/resp:



Results (Scandium-based Molecules)

Classical Metallofullerenes
Sc₂O₃@C₆₀

Metallic Oxide Fullerenes
Sc₂O₃@Cu₂

Metallic Nitride Fullerenes
Sc₂N@C₆₀

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