Ecological Researcher

Alex Demmers
Augustana College, Rock Island Illinois

Species diversification among soil invertebrates in regards to controlled burning

Alexander Demmers

INTRODUCTION

- Understanding how wildfires affect ecosystem is important
- Fire critical management tool for plant diversity
- Fire decreased overall diversity of soil-dwelling invertebrates one month after burn (Brown et al 2011)
- Fire increased overall beetle diversity, and decreased Diptera, Hymenoptera, Annelida, and Hemiptera orders from 24 hours up to one year after burn (Kalisz and Powell 2000; Wikars and Schimmel 1999)
- Fire decreased Arthropod abundance after one year (Coleman and Rieske 2006)

Holes in Research

- No research concerning soil-dwelling invertebrate diversity measures immediately after fire
- No research on controlled burns in meadows of central lllinois
- Studies inconsistent with invertebrate order predictions

Research Questions & Hypotheses

Research Questions

- What is the effect of fire on overall soil-dwelling invertebrate diversity?
- What specific order and/or family diversities are altered by fire?

Hypotheses

- Overall soil-dwelling invertebrate diversity will significantly decrease after fire
- Beetle (Coleoptera) diversity will increase after fire
- Flies (Diptera); wasps, bees, ants (Hymenoptera); worms (Annelida); true bugs (Hemiptera) will decrease after fire

Materials & Methods

1.Haphazardly choose spot in meadow

2. Set up barrier

3. Collect before sample

4. Trim grass, then burn

5. Collect immediate sample

6. Place samples in Berlese funnels for 24 hours

7. Repeat seven times

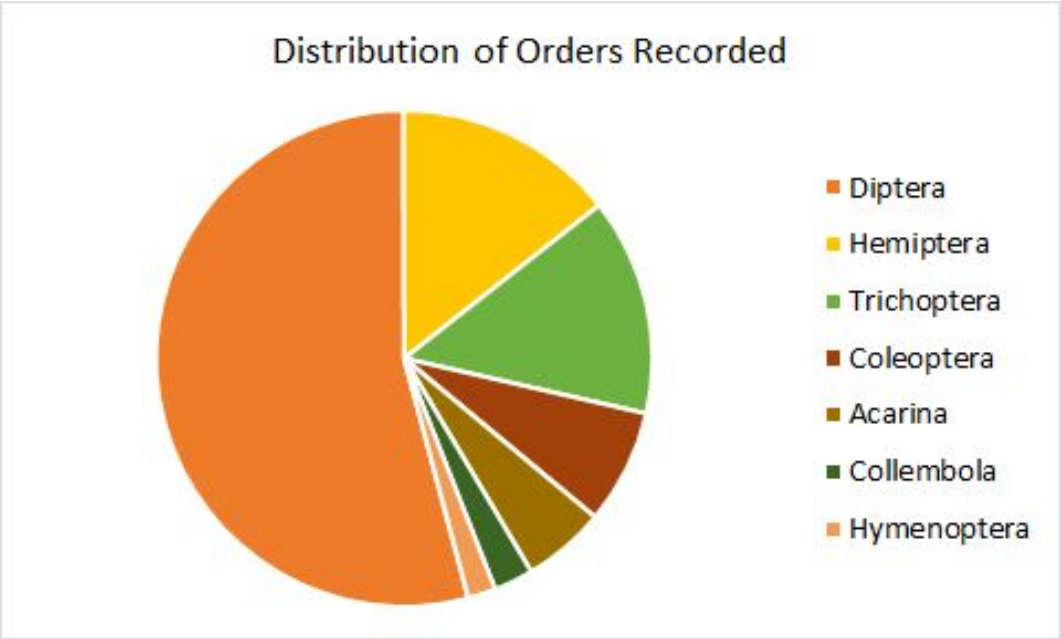
Materials & Methods: Additional Measures

nd 24 hours aft

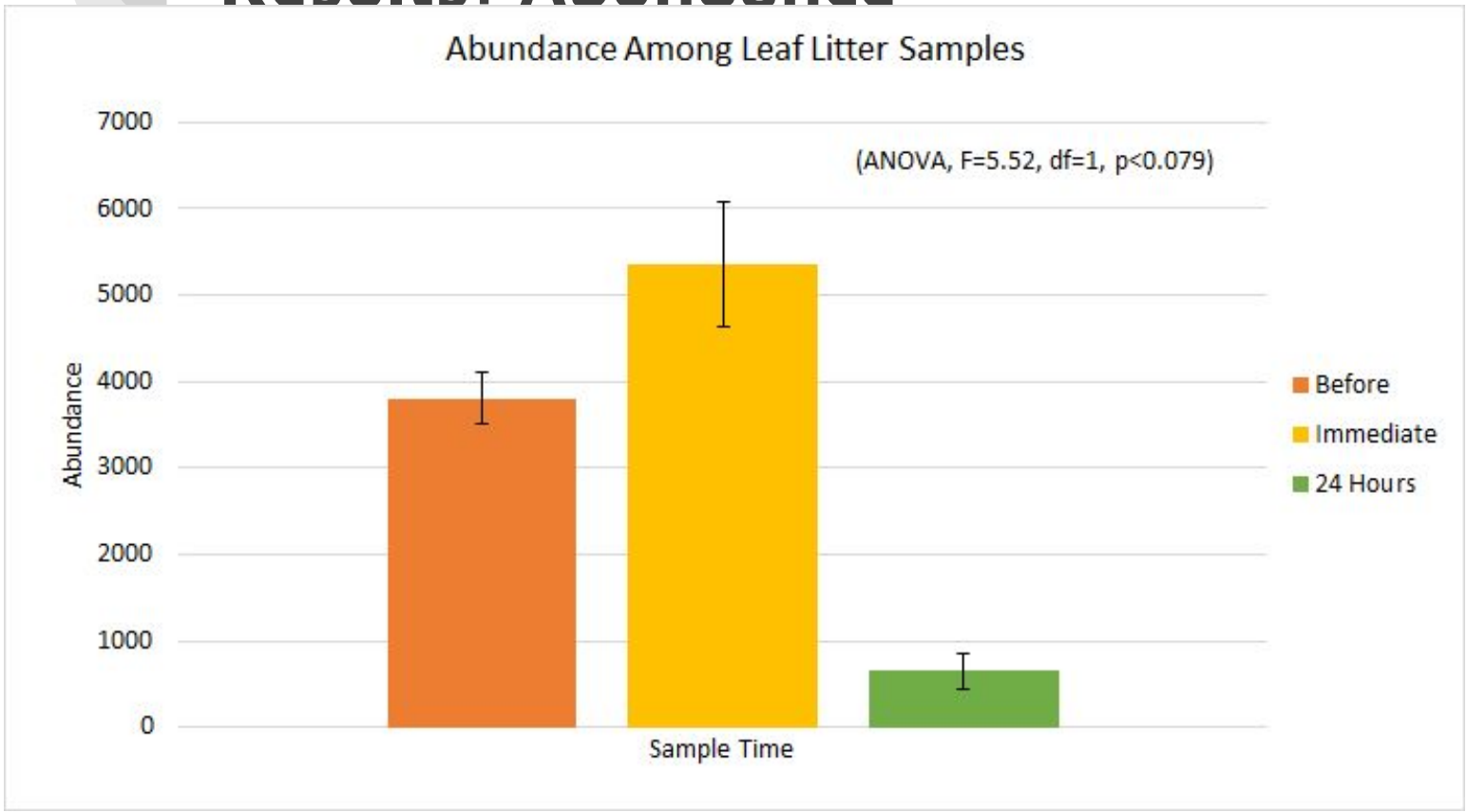
RESULTS

Data Recorded

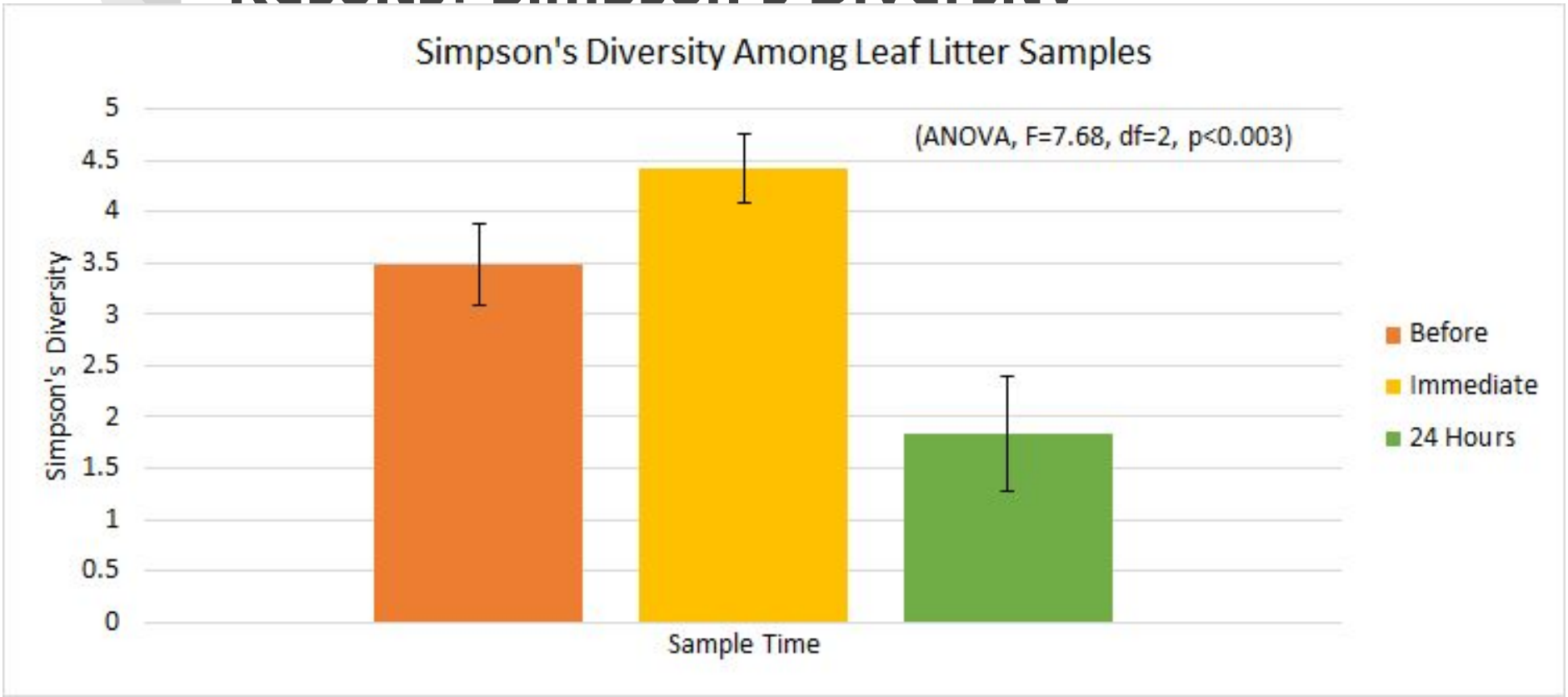
- 394 organisms
- 11 orders
- 36 families



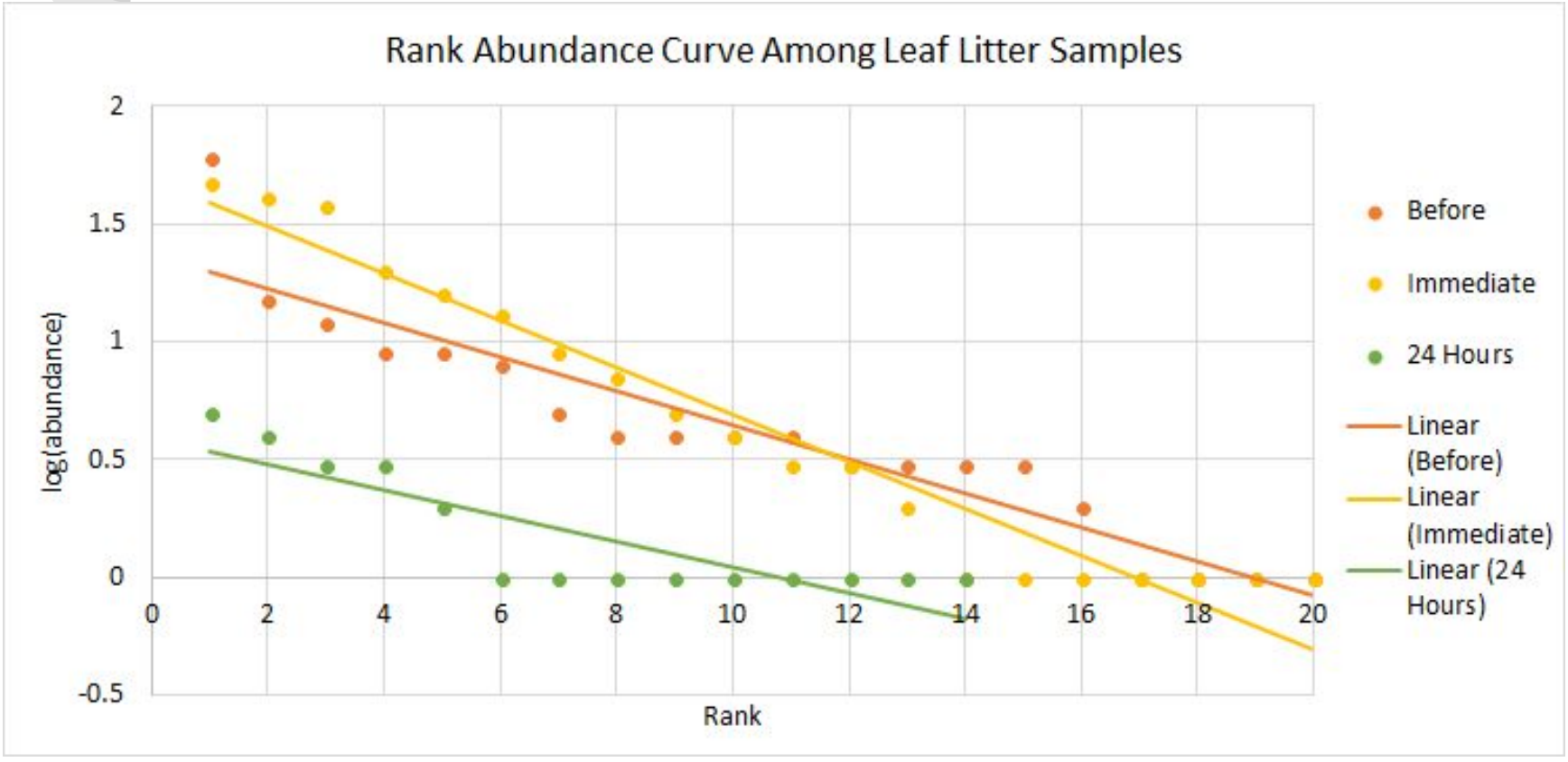
Results: Abundance



Results: Simpson's Diversity



Results: Rank Abundance



Results: Average Family Abundance

Order Acarina, family Bdellidae - mites

Order Coleoptera, family Carabidae - ground beetles

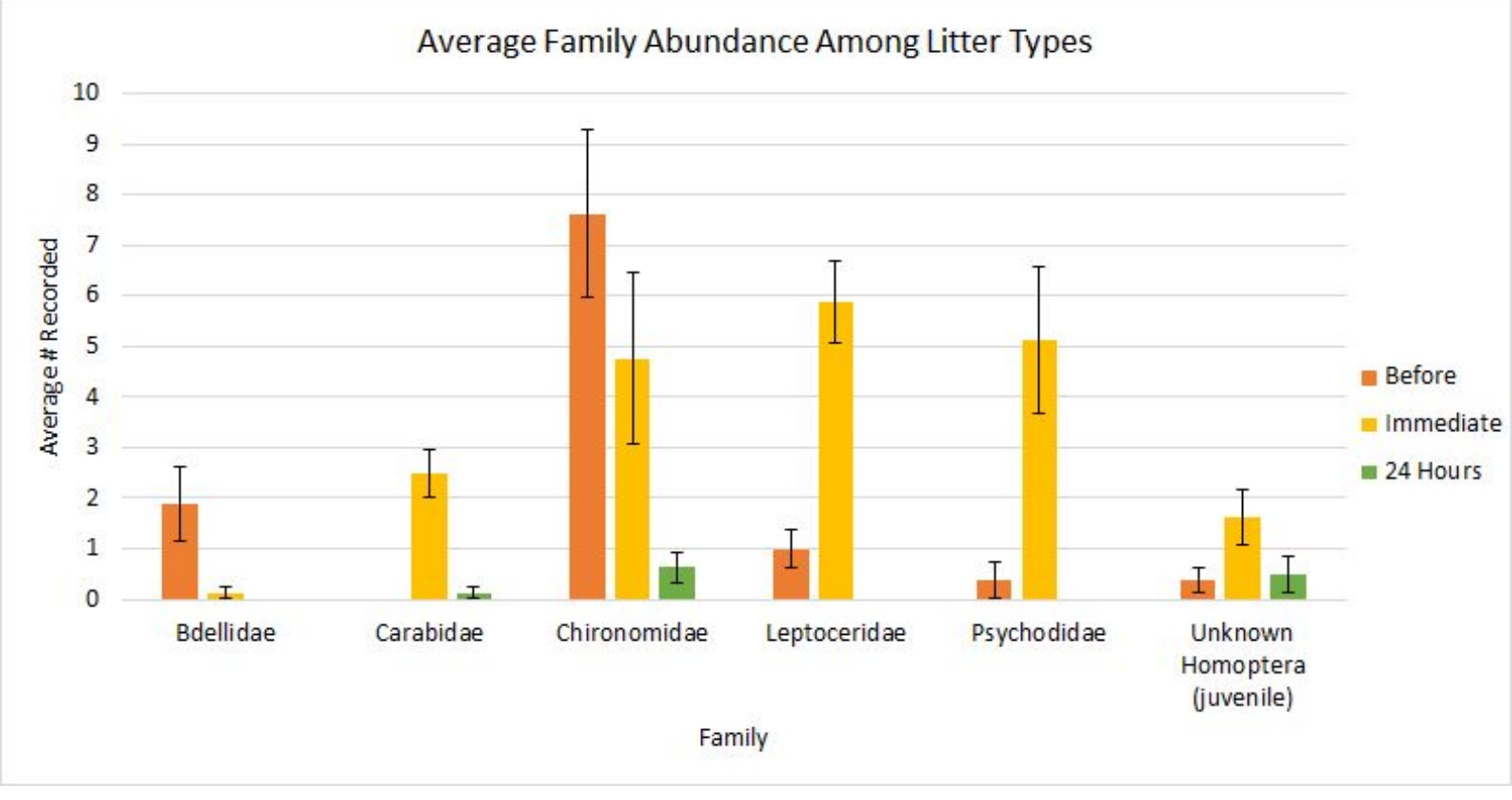
Results: Average Family Abundance

Order Diptera, family Chironomidae - midges

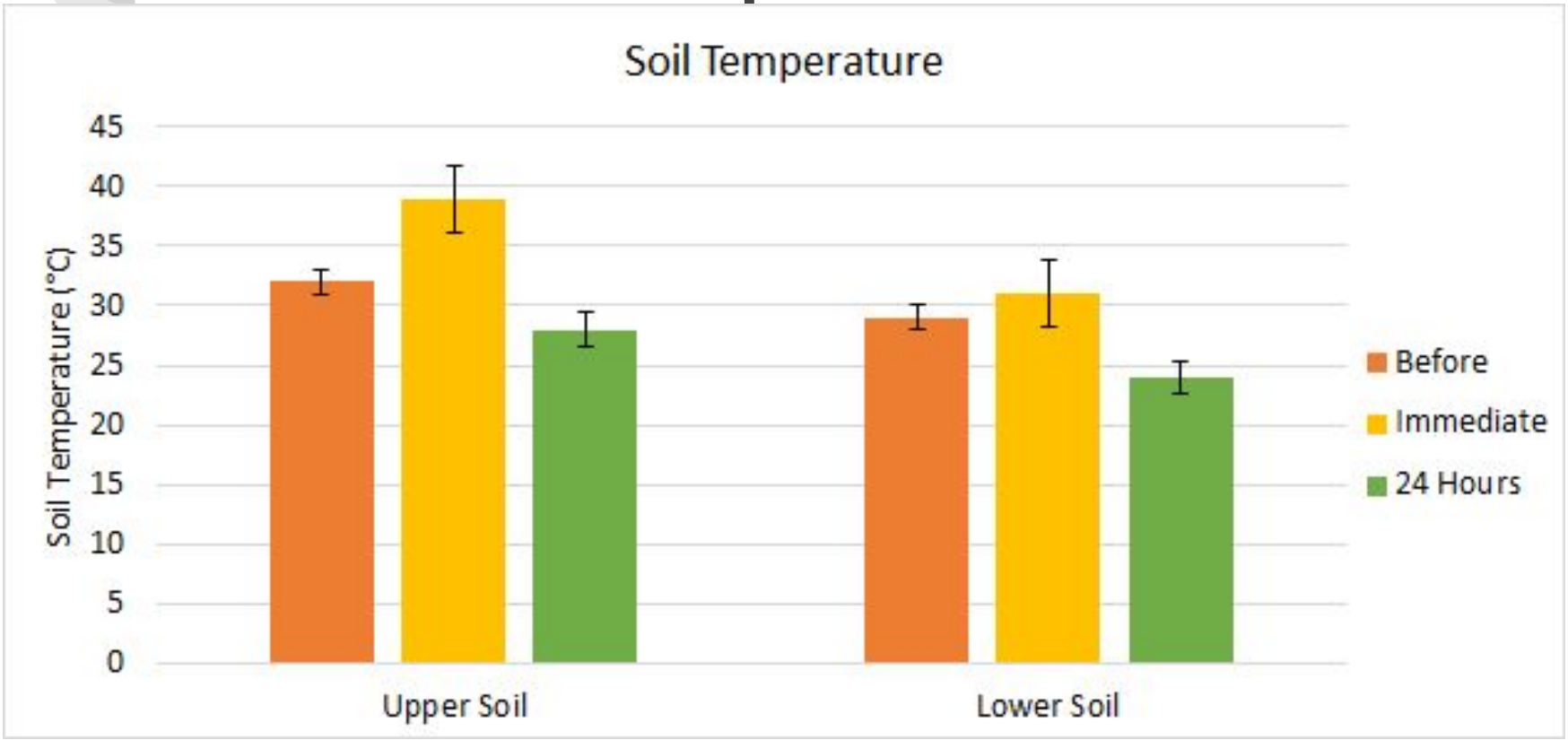
Order Trichoptera, family Leptoceridae - longhorned caddisflies

Order Diptera, family Psychodidae - moth flies

Results: Average Family Abundance



Results: Soil Temperature



Discussion

- Most important finding: diversity of Flies, Bees, and Beetles decreased after 24 hours, as Wikars and Schimmel (2000) suggested
- The fires decreased Arthropod diversity just as the results of Coleman and Rieske (2006) suggest
- Reasonable to infer the overall decrease in invertebrate diversity found by Brown et al. (2011) would be found if study extended

Conclusion

- Overall invertebrate diversity partially agrees with hypothesis
- Specific invertebrate orders altered as expected
- Soil temperature most likely had no effect

Limitations and Future Study

Limitations

- Larger sample size more ideal
- Longer period for sampling

Future Study

- Implement various degrees of burn intensities
- Take soil temperature at each burn site

QUESTIONS?

References

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