



In partial fulfillment of the requirements for the degree of

Master of Science
Jonah Brosemann

Will present his scientific paper

Nutrient supply and accessibility in plants: effect of protein and carbohydrates on *Chortoicetes terminifera* preference and performance

Wednesday, April 14, 2021

4:00 pm MST

<https://asu.zoom.us/j/88337031866?pwd=a2hPOE1GNcT6MzRXd1VKYzBUczhjdz09>

Faculty, students, and the general public are invited.

Supervisory Committee:
Dr. Arianne Cease, Co-Chair
Dr. Rick Overson, Co-Chair
Dr. Marion Le Gall, Member
Dr. Jesse Senko, Member

Abstract

Much is known about protein limitation for herbivorous insects. However, recent studies showed that migratory insects do not appear to be protein-limited, but carbohydrate-limited. In this study, we investigated the effects of plant carbohydrate availability on plant selection and performance for a generalist herbivore, the Australian plague locust, *Chortoicetes terminifera*. We manipulated the protein and carbohydrate content of wheat (*Triticum aestivum* L.), a common host plant by two means: 1) increasing the protein:carbohydrate ratio using fertilizer (46:0:0), 2) increasing carbohydrate accessibility by grinding plant cell walls. Using a factorial design, we ran both choice and no-choice experiments to record preference and performance. We confirmed locust preference for plants with a lower protein-

carbohydrate ratio (unfertilized/control treatment). Unlike previous studies, we found that fresh plants supported better performance than ground plants, suggesting that nutrient accessibility may have been negatively impacted by other mechanical and/or chemical factors associated with grinding. These results add to the growing body of evidence suggesting that several locust species perform better on plants with a lower protein:carbohydrate ratio. We discuss these results in the light of land management alternatives for these transboundary pests.