Rosinweed Terminal Stem-Gall Wasp Response to Fire

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Antistrophus silphii



Order: Hymenoptera

(bees, wasps, and ants)

Family: Cynipidae (gall-maker wasps)

Restricted to rosinweed & cupplant

Specimen emerged from rosinweed gall May 2008 from Underwood Prairie, Iowa Co, WI.

Image by Scott Sauer

Terminal stem galls on rosinweed





By R. Henderson



Terminal Stem Galls

Rosinweed

Typical forms and range of size (1-4 cm in dia)



Cross Section of Rosinweed Gall



Effect of fire on Antistrophus silphii?

- Wasps restricted to rosinweed (cupplant?) as host plants.
- Rosinweeds are primarily restricted to prairie remnants or plantings.
- Wasps present on limited number of sites with rosinweed (WI: 23% of remnants & 13% of plantings w/ rosinweed).
- Wasps spend 96% of their annual live cycle in above ground plant tissue. (adults emerge in May or June, and only live a couple weeks)
- Therefore, *Antistrophus silphii* is extremely vulnerable to most fires, and likely of conservation concern.



1) Fay & Samenus (1993). Gall wasp mortality in a spring tallgrass prairie fire.

Fay & Samenus (1993)

- Konza Prairie (3,500 ha; 8,600 a) in Flint Hills of eastern Kansas.
- Found no wasp survival in burn (head fire) for n=160 galls).
- A 20 ha (50 ac) area had been annually burned for decades, yet had galls.
- Found gall populations are depressed following a burn, but increase in each following year.
- Apparent recolonization from un-burned areas, and possibly from rare in situ survival events.

Research Questions

 How far can they disperse to recolonize?

• Is there an edge effect (fewer galls with distance from refugia)?

Study in WI – 2008 Underwood Prairie

Adjacent remnant and planted prairie

 Large population of rosinweed w/ terminal stem galls

Rotationally burned

Underwood Prairie (Iowa Co., WI)

Low Lat have the mark hard the trans

KI -

Managed by The Prairie Enthusiasts

Research Questions

1. Are there fewer rosinweed galls in areas burned in current year?

2. Is there a correlation between gall density and distance from un-burned areas?

Rosinweed Gall Sampling Grid Layout

Underwood Prairie, Iowa Co, WI



Survey Transects

(transect lines10 m a part)



Sampled 60% of the area

Results

- An estimated 410 galls per acre
 - 410 galls/ac x 5 wasps/gall = 2,000 wasps/ac
 - 5-acre study area will produce an estimated 10,000 wasps the following spring
- Surprisingly, no apparent negative effect of fire.











Gall Density



Possible Explanations (in need of further investigation)

- Difference in host plant food value, and thus attractiveness to wasps, in burn vs. no-burn?
- A fluke of annual variation, weather conditions? (need replications)
- 80 meters not sufficient to test wasps dispersal ability?
- Wasps attracted to areas of highest stem density?
- Topographic position (hill topping)?



Underwood Prairie

Surveyed for Galls in 2011 & 2012

- Larger area than in 2008
- Used 2.4 m² quadrats
- 1/3 of area burned each year

Investigation Goals

- Annual variation
- Topographic position (hill topping)



Stem Density - 2011



Stem Density - 2012

Burn

No Burn







% of Stems w/ Galls - 2012



Gall Density - 2011

Low

Med

Topographic Position

Galls / Quad

0.5

0.0

High

Gall Density - 2012



Gall Production - Density



Gall Production - Density



Gall Production - Frequency

