Rosinweed
Terminal Stem-Gall Wasp Response to Fire
Antistrophus silphii

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

Order: Hymenoptera
(bees, wasps, and ants)

Family: Cynipidae
(gall-maker wasps)

Restricted to rosinweed & cupplant
Terminal stem galls on rosinweed
Terminal Stem Galls

Rosinweed

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

Rosinweed

By R. Henderson
Cross Section of Rosinweed Gall

Larvae/gall
- 30 in IL (Tooker)
- 20 in KS (Fay)

Wasp chambers
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.

Published research on fire effect

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 re-colonize?

• 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
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?
Survey Transects
(transect lines 10 m a part)

gall count area
(60 m² total)

stem count quadrat
(1 m²)

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.
The graph shows the gall density in burned and unburned areas. The density is measured in galls per 1 m². In the burned area, the gall density is higher with 0.15 galls per 1 m² (N = 151). In the unburned area, the gall density is lower with 0.05 galls per 1 m² (N = 56).
Rosinweed Stem Density

(1 m² quads)

Burned area
(N = 151)

Un-burned area
(N = 56)
Gall Frequency

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<th>Gall Frequency</th>
<th>% of Stems w/ Galls</th>
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Location

- Burned area: 2.5%
- Un-burned area: 0.5%
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)
Gall Production - Density

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<th>Un-burned</th>
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