



ANTI-HERBIVORE DEFENSE IN
MALE AND FEMALE BOIS-D'ARC
TREES (*MACLURA POMIFERA*)

Stanley Rice

Southeastern Oklahoma State University





Bois-d'arc

Family Moraceae

Separate male and female trees

Native to Red River Valley region

Widely planted as hedgerows in the past





Flowers:

Male catkins

Female aggregate fruit with exserted stigmas

Pollination: wind??

Fruits

Large

Dispersal agent??





Maclura pomifera



Axillary buds produce:

Clusters of leaves

Thorns

Both





Hypothesis: Male trees have fewer and/or smaller thorns

Reason: Males have a smaller reproductive investment and would suffer less from herbivore damage

Problem: Which herbivore?





Study organisms: about thirty trees from each:

SOSU BioScience Area (Lake Texoma)

Reasor property near Atoka

Measurements (usually in late winter):

Number and length of thorns per m of stem

Trunk diameter (usually clustered) and exposure

Direct measures where possible

North, east, west, and south



Results and analysis: thorns and sex

Index of thorniness included size and number

Chi-square test:

Variable	probability > chi square
Sex	0.0444
Exposure	0.0418
Diameter	0.3511



What the results mean:

Female trees had greater thorniness, but not a sex-linked characteristic

Exposed trees had greater thorniness

Trunk diameter had no significant effect

Note: males and females did not differ significantly in trunk diameter: not due to females in rich or moist soil

Note: one site was more forested; thus site and exposure confounded





Hypothesis: Leaves of female trees have greater toxicity

Reason: Males have a smaller reproductive investment and would suffer less from herbivore damage

Observation: Very little herbivore damage

Note: Usually but not always same trees on which thorniness was estimated.





Results:

Individual trees differed remarkably in toxicity

No relationship of toxicity to:

Trunk diameter ($p = 0.854$)

Leaf weight ($p = 0.864$)



Means of shrimp mortality

Males 32.7%

Females 50.8%

$t = -2.72$

$p = 0.0075$

Open 53.6% Partial 39.4% Shaded 39.4%

“open” ranked first and almost last

Thorns 41.3%

No thorns 42.0%



Conclusion: Females are thornier

Conclusion: Females have more toxic leaves

Conclusion: No tradeoff between physical and chemical defense

Future research: increase sample size with more populations (external validity)

