

Comparative performance of drill and broadcast winter cover crops in nursery production and their impact on arthropod communities



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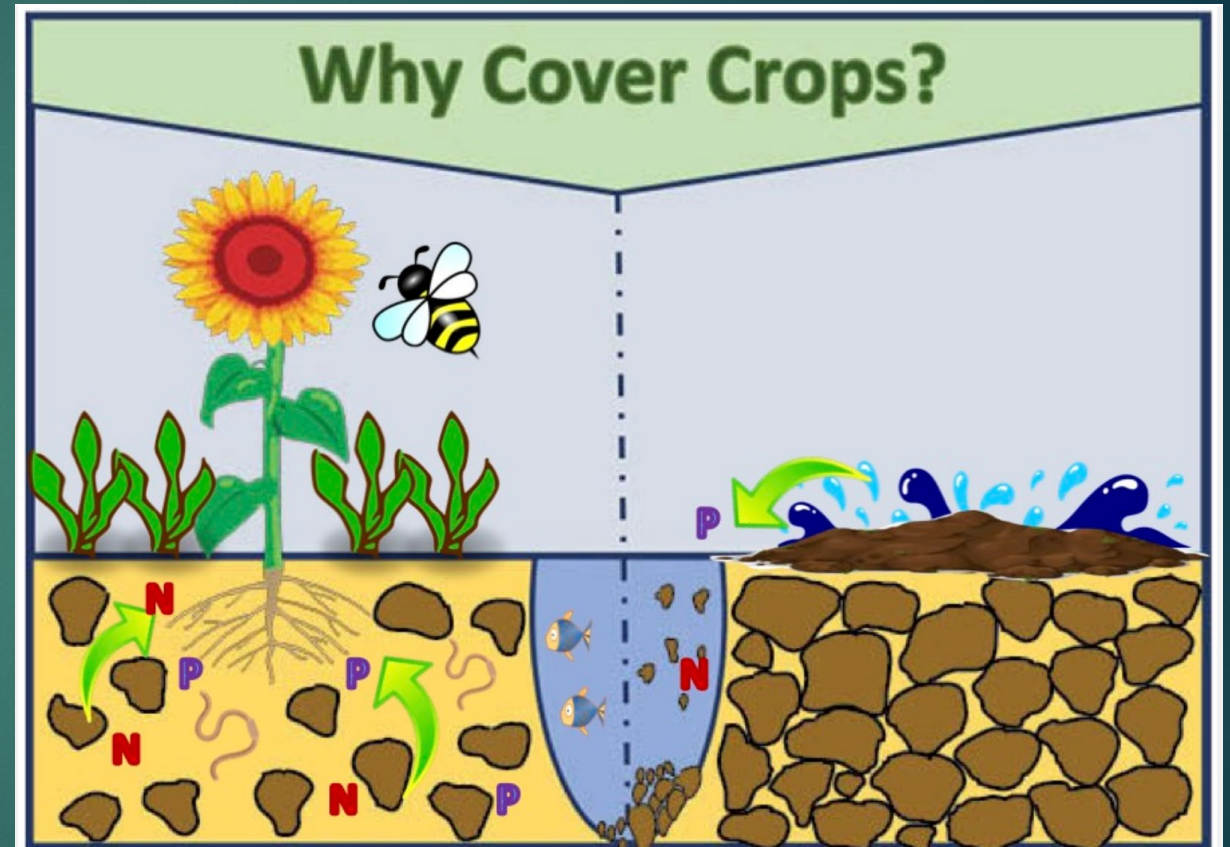


INTRODUCTION

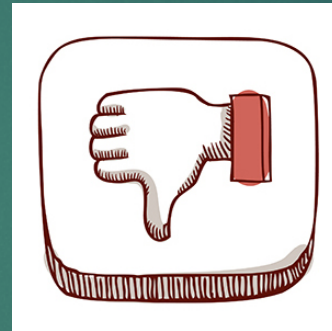
- Cover crops can provide multiples benefits to nursery farmers by **improving the soil quality and organic matter levels**. Establishment of covers crops by selecting the right planting method is crucial to **assure good germination**.

Benefits of Cover Crops

- Improving nutrient cycling
- Increased organic matter
- Reduced soil erosion
- Increased weed suppression
- Increased water absorption
- Improved wildlife habitat



Source: University of Wisconsin-Madison



Additional cost

Pest problems

Timing



Objective



To evaluate the arthropod population and assess population diversity in woody ornamental production system in response to winter cover crop species and their establishment method.

Winter Cover Crops Species

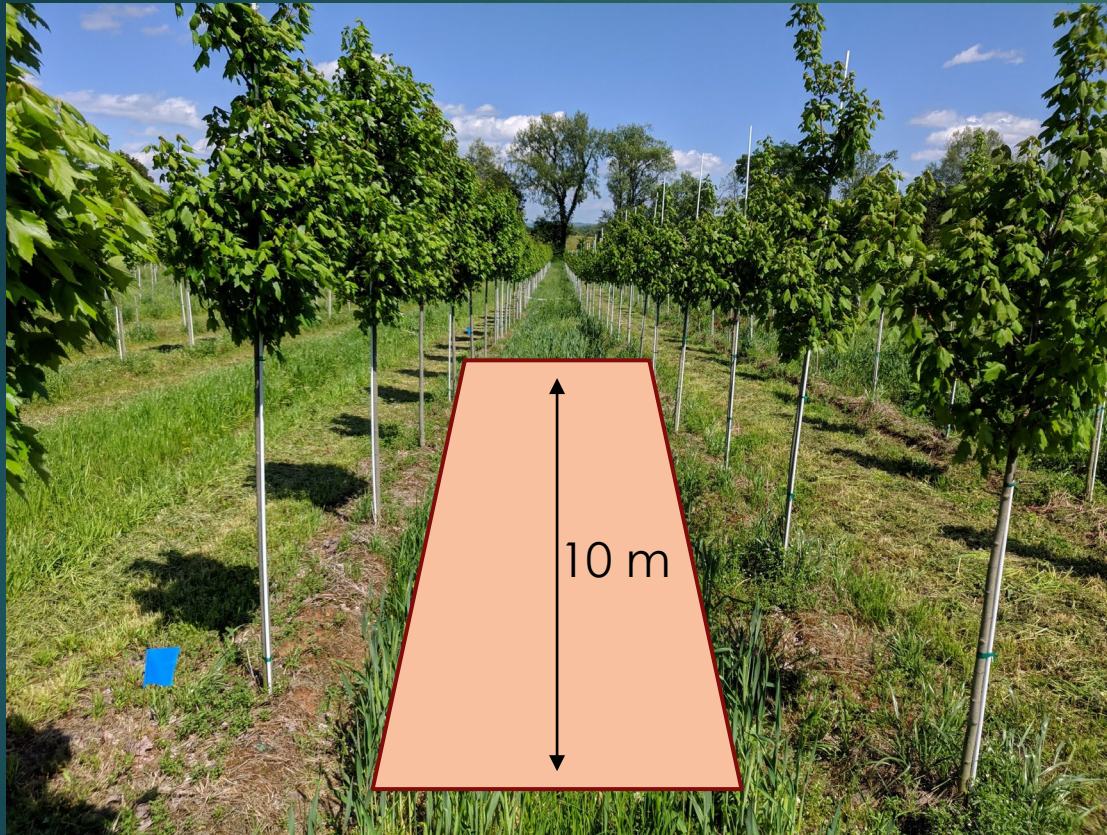
- ▶ Crimson Clover (*Trifolium incarnatum* L)



- ▶ Triticale (× *Triticosecale* W)



Methods



A. Experimental Design: Cover crops species in RCBD with 4 replicates

B. Treatments and control:
Crimson Clover Drill
Crimson Clover Broadcast
Triticale Drill
Triticale Broadcast
Untreated (control)

Cover Crop Establishment and Density

30 x 30 cm PVC Square frame



Arthropod Monitoring and Assessment





Arthropod Diversity in Plots

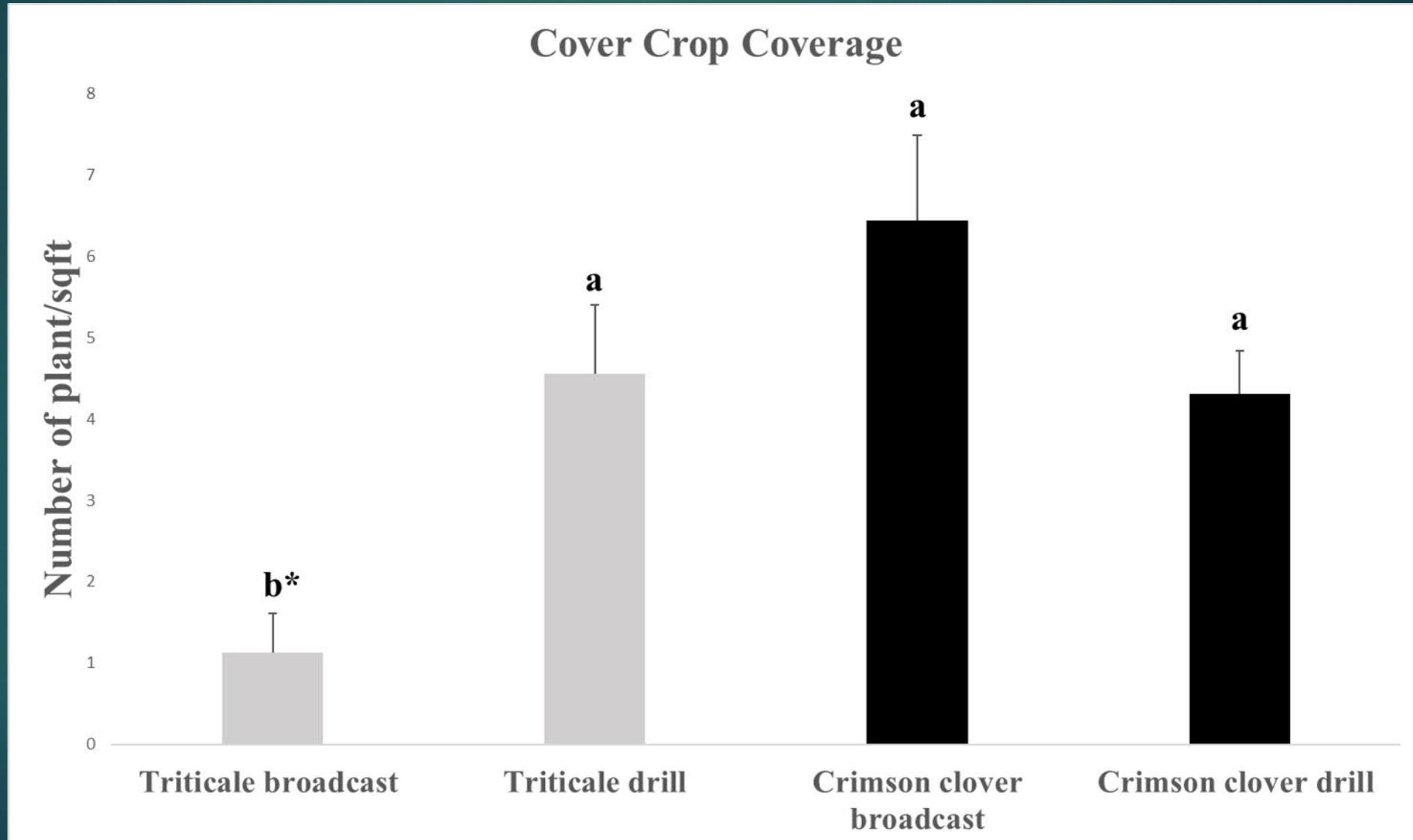
Arthropod community diversity indices were calculated by using Simpson's index.

Diversity was calculated by using the formula: $D = 1 / \sum_{i=1}^S (p_i^2)$

and evenness by using the formula: $ED = D / D_{max} = 1 / \sum_{i=1}^S (p_i^2) \times 1/S$

- D = Diversity index
- S = total number of species (families) in the community (richness)
- p_i = proportion of S made up of the i th family
- ED = equitability (evenness)

Results Cover Crop Establishment



Results

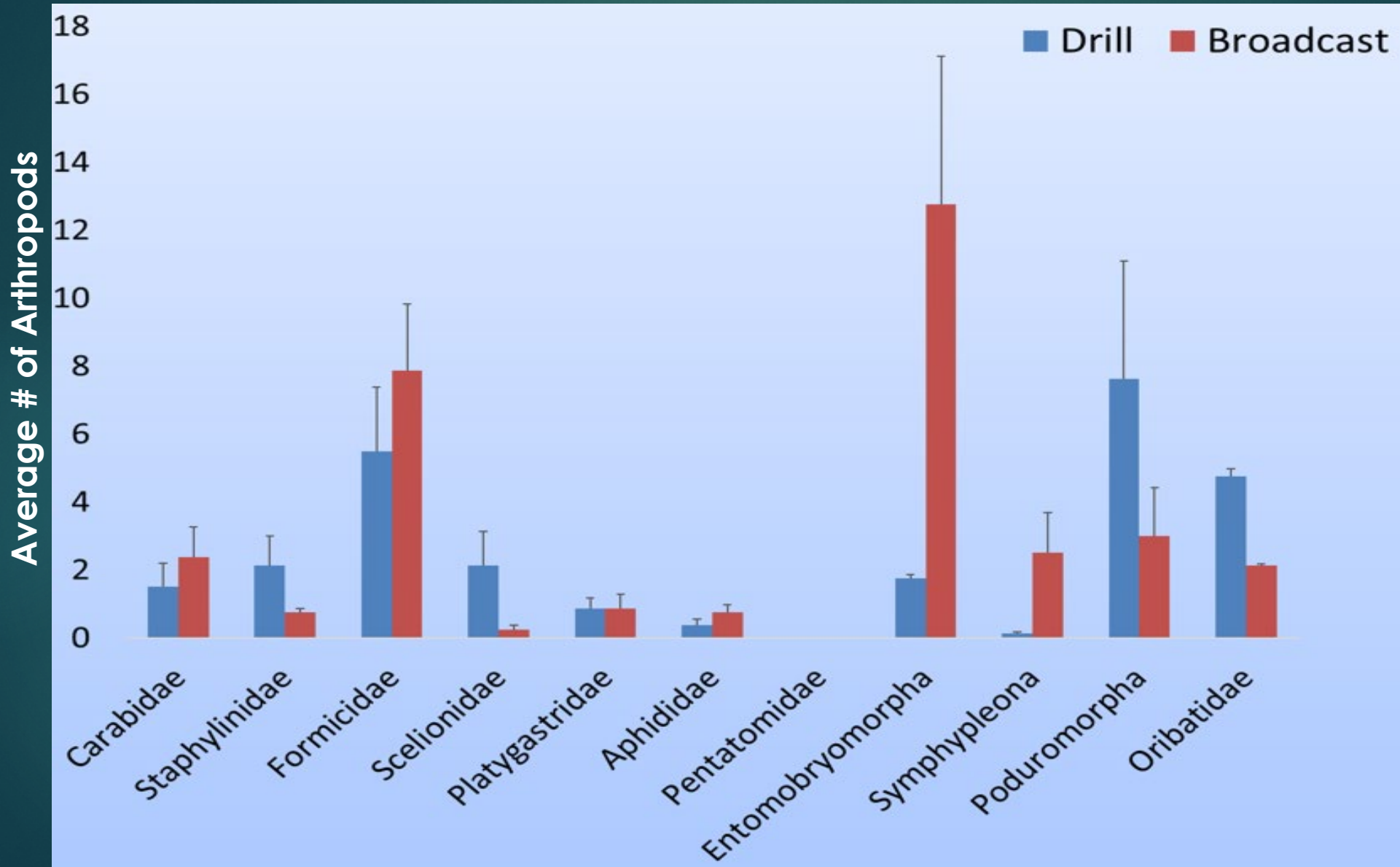
Diversity Index

Treatment	Diversity index	Equitability	Family richness
Crimson Clover Broadcast	3.75 ± 0.71 a	0.22 ± 0.05 a	18.00 ± 1.35 a
Crimson Clover Drill	6.03 ± 0.79 a	0.30 ± 0.06 a	21.50 ± 1.94 a
Triticale Broadcast	6.76 ± 2.02 a	0.28 ± 0.07 a	23.50 ± 2.33 a
Triticale Drill	5.68 ± 1.37 a	0.28 ± 0.05 a	19.75 ± 1.11 a
Weeds	5.04 ± 0.60 a	0.22 ± 0.02 a	22.50 ± 1.66 a
<i>F</i> value	0.87	0.47	1.61
df	4	4	4
<i>P</i> value	0.5039	0.7573	0.2231

Treatments; 1) Triticale Drill, 2) Triticale Broadcast, 3) Crimson Clover Drill, 4) Crimson Clover Broadcast, 5) Weeds as control.

Results

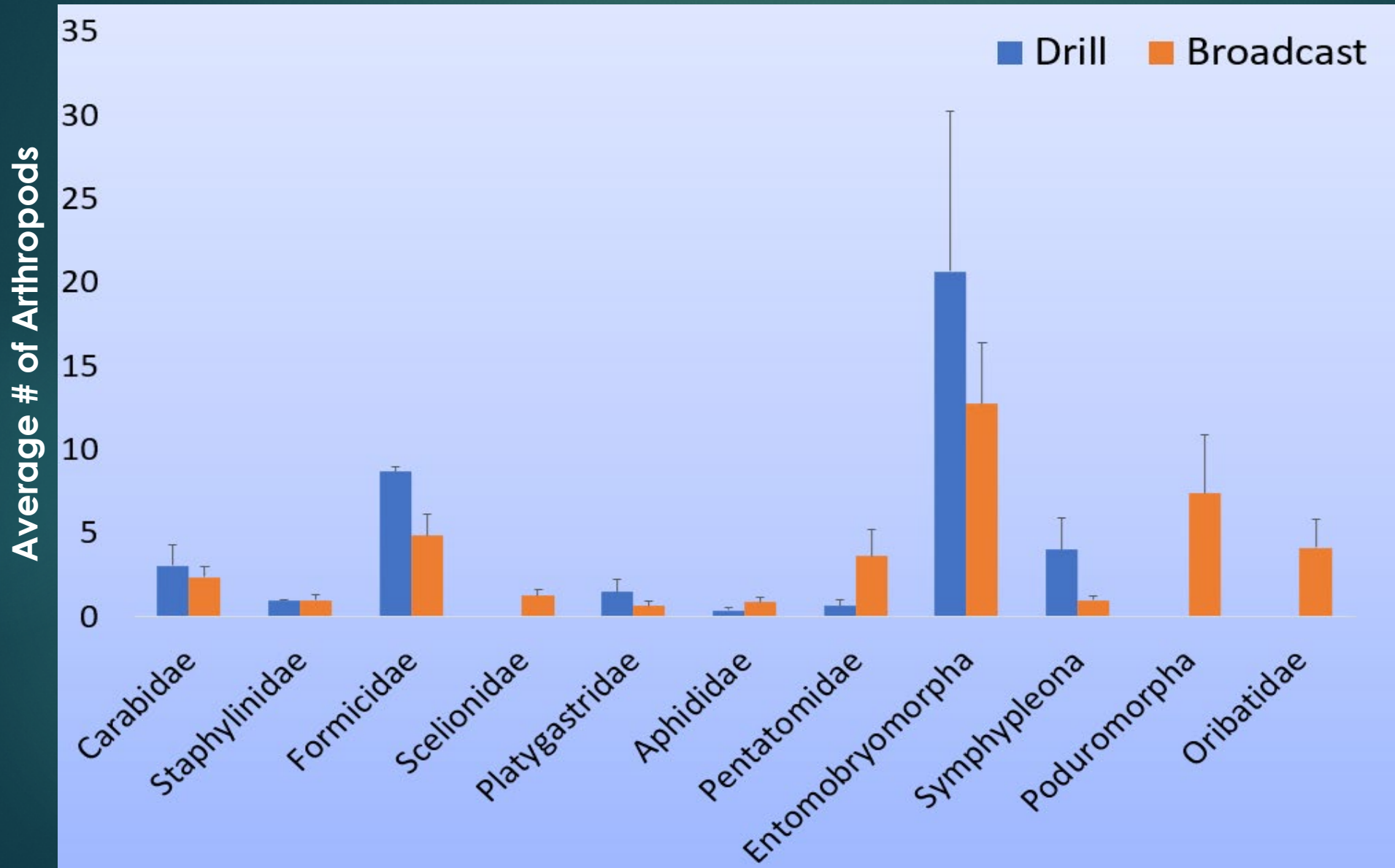
Top 10 Crimson Clover Arthropods Groups



CC Broadcast: 950
CC Drill: 540

Results

Top 10 Triticale Arthropods Groups



Triticale Broadcast: 1,336

Triticale Drill: 1,805

Conclusions

- ▶ Crimson clover can be successfully established as a cover crop by both **Drill** and **Broadcast** methods.
- ▶ **Establish Triticale by Drill planting:** triticale may need soil contact to assure germination.
- ▶ In **broadcast-planted crimson clover**, Collembola (*Entomobryomorpha*) were the **most abundant arthropod group**.
- ▶ In drill- and broadcast- planted crimson clover, soil mites (Oribatidae) were present. These mites were only found in triticale when broadcast-planted.



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Questions?

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