

Comparative Observation of Trichome Type and Density in *Solanum* spp.

Using Scanning Electron Microscopy

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Introduction

- Trichomes are small hairlike growths on the epidermis of plants.
- They serve many roles including protection from predators and the environment.
- The different types of trichomes, glandular and non-glandular, serve different purposes.
- Plants put more resources into their younger shoots and leaves, taking resources from older plant material in the process.

Research Question

How does the trichome type and density on different *Solanum* spp. change as plants age?

Materials and Methods

- Four *Solanum* species obtained from TGRC: two wild types (*S. chilense* LIA1972 and *S. pimpinellifolium* LIA2093) and two cultivars (*S. lycopersicum* cv. *Malintka 101* LIA3120 and cv. *Saladette* LIA2662). Leaf tissues were analyzed about 100 days after planting.
- Morphology was observed using a Tescan Vega3 SEM, and trichome counts were performed under a light microscope.
- ANOVA followed by Tukey's HSD test ($p < 0.05$) was used for multiple group comparisons.

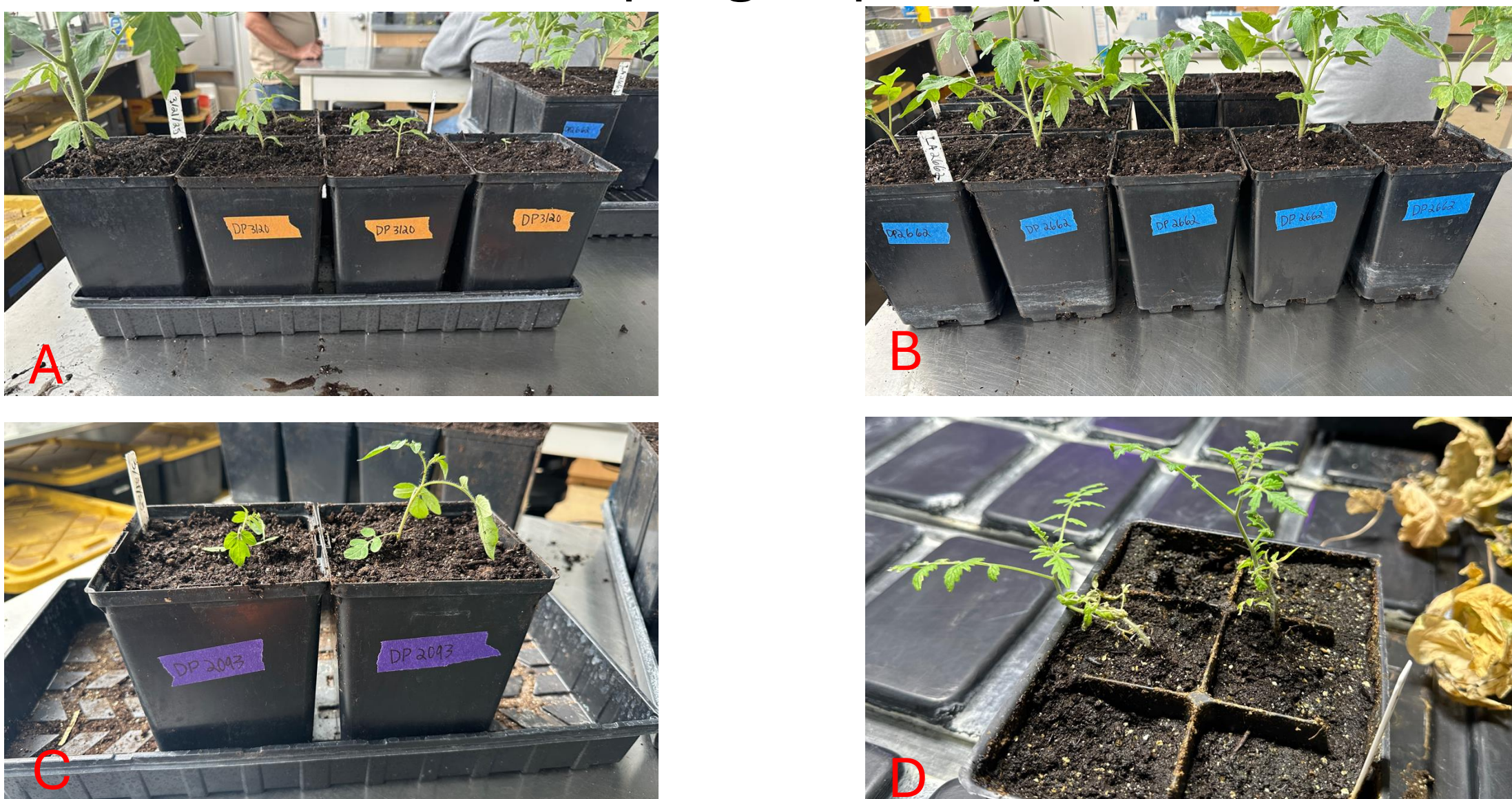


Figure 1. (A) *S. lycopersicum* cv. *Malintka 101*; (B) *S. lycopersicum* cv. *Saladette*; (C) *S. pimpinellifolium*; (D) *S. chilense*.

Results

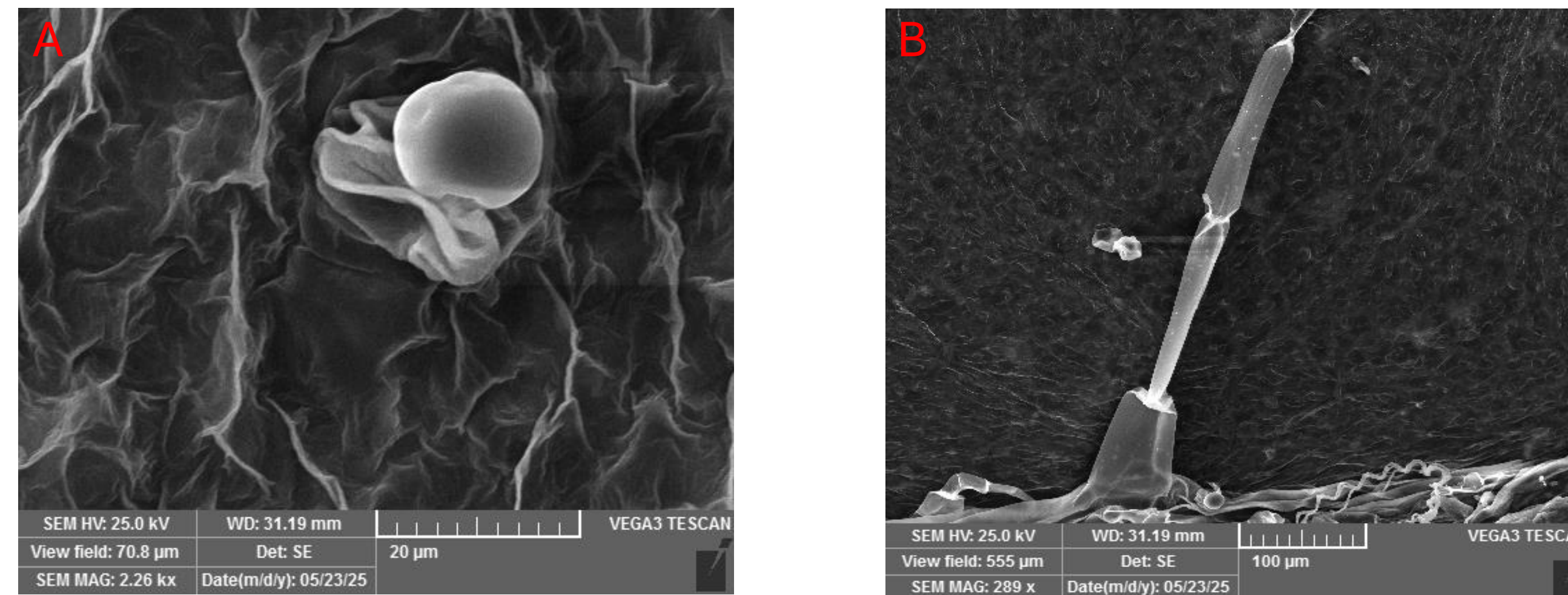


Figure 2. (A) Glandular trichome on the adaxial surface of *S. lycopersicum* cv. *Saladette*; (B) non-glandular trichome on the same sample.



Figure 3. (A) Adaxial surface from the bottom of *S. lycopersicum* cv. *Saladette*; (B) adaxial surface from the middle; (C) adaxial surface from the top of the same specimen.

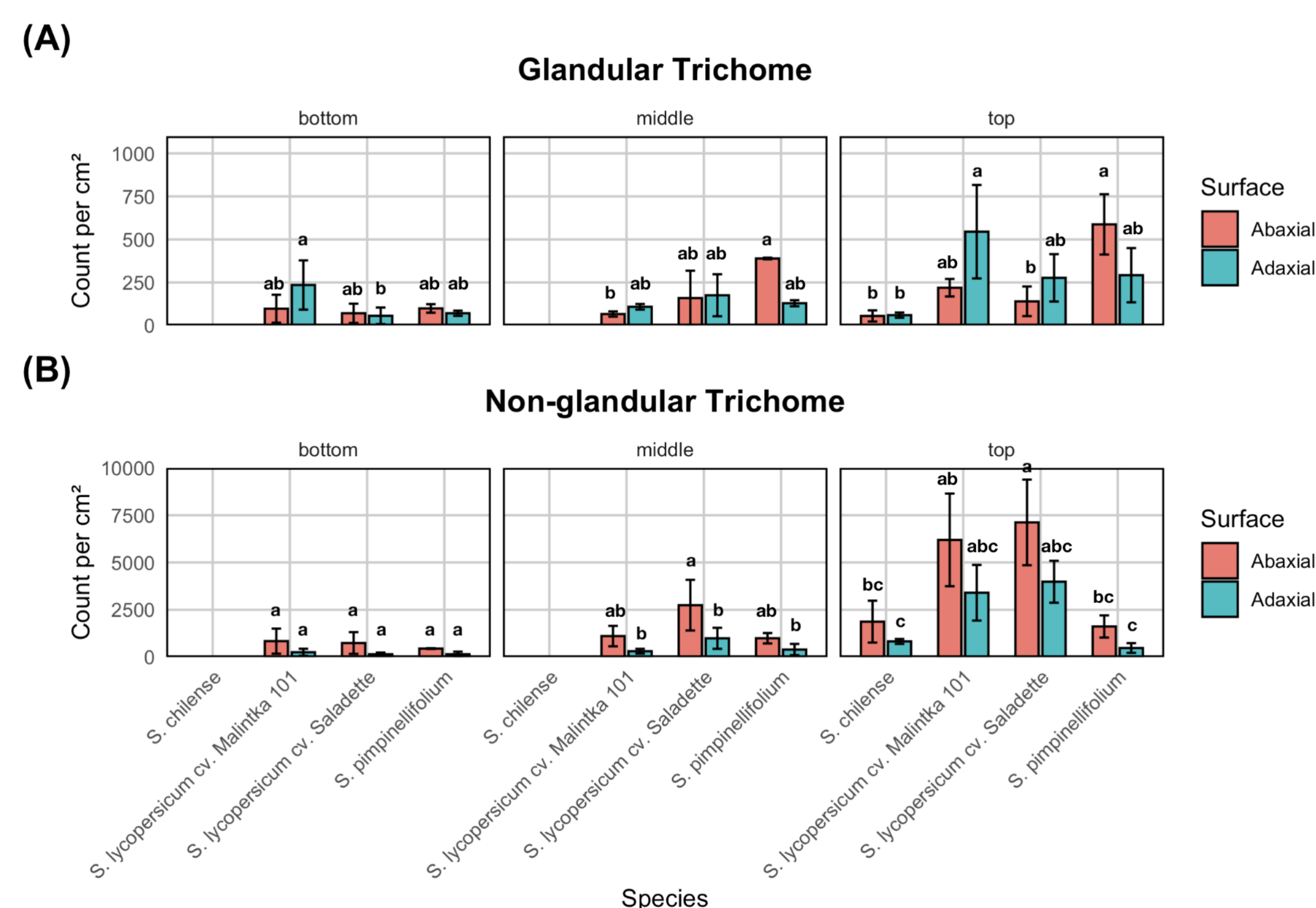


Figure 4. (A) Glandular and (B) non-glandular trichome counts at bottom, middle, and top sections of all species, showing increased density toward the upper plant parts.

Discussion

The abaxial side has a higher non-glandular trichome density than the adaxial side. This is to prevent predatory insects from laying eggs and destroying the leaves. Both the glandular trichomes as well as the non-glandular trichomes showed an increase in density as you moved further up, distal from the base. This is likely happening to protect its newer, weaker leaves. Overall, the 2 wild type species had less trichomes per cm² than the commercial varieties. One wild type (*S. chilense*) had trouble germinating and remained in the vegetative growth stage. We will continue to manage these plants and collect data when plants mature. We can now use this as our preliminary data moving into the next phase of the experiment, monitoring changes caused by herbivores.

Species	B AD	B AB	M AD	M AB	T AD	T AB
<i>S. lycopersicum</i> cv. <i>Saladette</i>	58	231	330	820	1203	2051
<i>S. lycopersicum</i> cv. <i>Malintka 101</i>	139	204	120	332	1116	1813
<i>S. pimpinellifolium</i>	63	156	149	392	219	624
<i>S. chilense</i>	n/a	n/a	n/a	n/a	251	545

Conclusion

- Wild type species have less glandular and non-glandular trichomes than commercial species.
- The abaxial side has a higher trichome density than the adaxial.
- Trichome density increases towards the top of the plants.
- We can now start the next phase, where we will see how herbivory damage changes the data.

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