

Cucumber cultivar susceptibility against twospotted spider mites in high tunnels

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Introduction:

The importance of producing in high tunnels



- Season extension
→ multiple harvest
- Protection from rainfall and wind
- High quality crops

Introduction:

Disadvantages of high tunnels



- Limited capacity to cold down on summer
- Dry environment (no rainfall)

Introduction:

Twospotted spider mite (*Tetranychus urticae*)



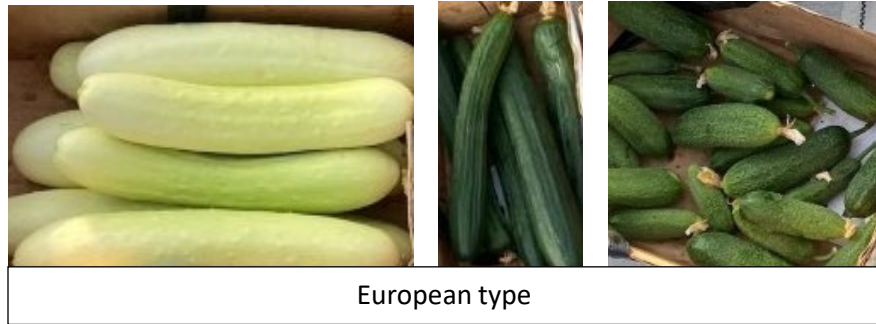
- Second most damaging pest
- High tunnels create ideal environment
- They cause stippling damage
 - yellowing and chlorotic leaves
 - senescence
 - plant death
- Early detection difficult

The background image shows a close-up of a cucumber plant. A white plastic protective bag is visible on the left side, partially covering a cucumber. To the right, a large, brown, and heavily damaged leaf is shown, with significant necrosis and discoloration, indicating the presence of a pest or disease. The overall scene is set in a greenhouse or nursery environment.

Objective

Evaluate susceptibility of cucumber cultivars to Twospotted spider mites

Materials and Methods



- 10 cultivars per row (3 plants per cultivar)

→ European type

★ Pickle type

→ American type

★ Slicer type

→ Asian type

Materials and Methods



- Locations:

- PPAC (6 rep.)

- MEIGS (8 rep.)

- SWPAC (4 rep.)

Materials and Methods



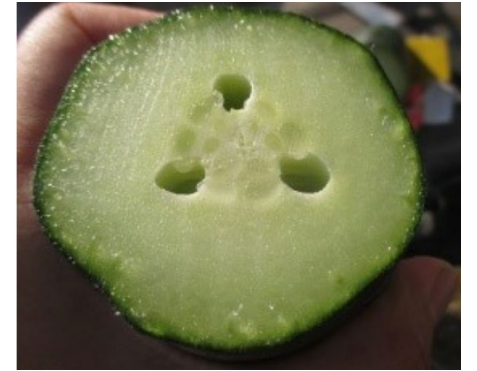
- Total yield
- Number of fruit



Marketable



Unmarketable



Oversize

Materials and Methods



H-B Score	% Affected
1	0
2	>0 to 3
3	3 to 6
4	6 to 12
5	12 to 25
6	25 to 50
7	50 to 75
8	75 to 87
9	87 to 94
10	94 to 97
11	97 to 100
12	100

Materials and Methods

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- Insect survey:

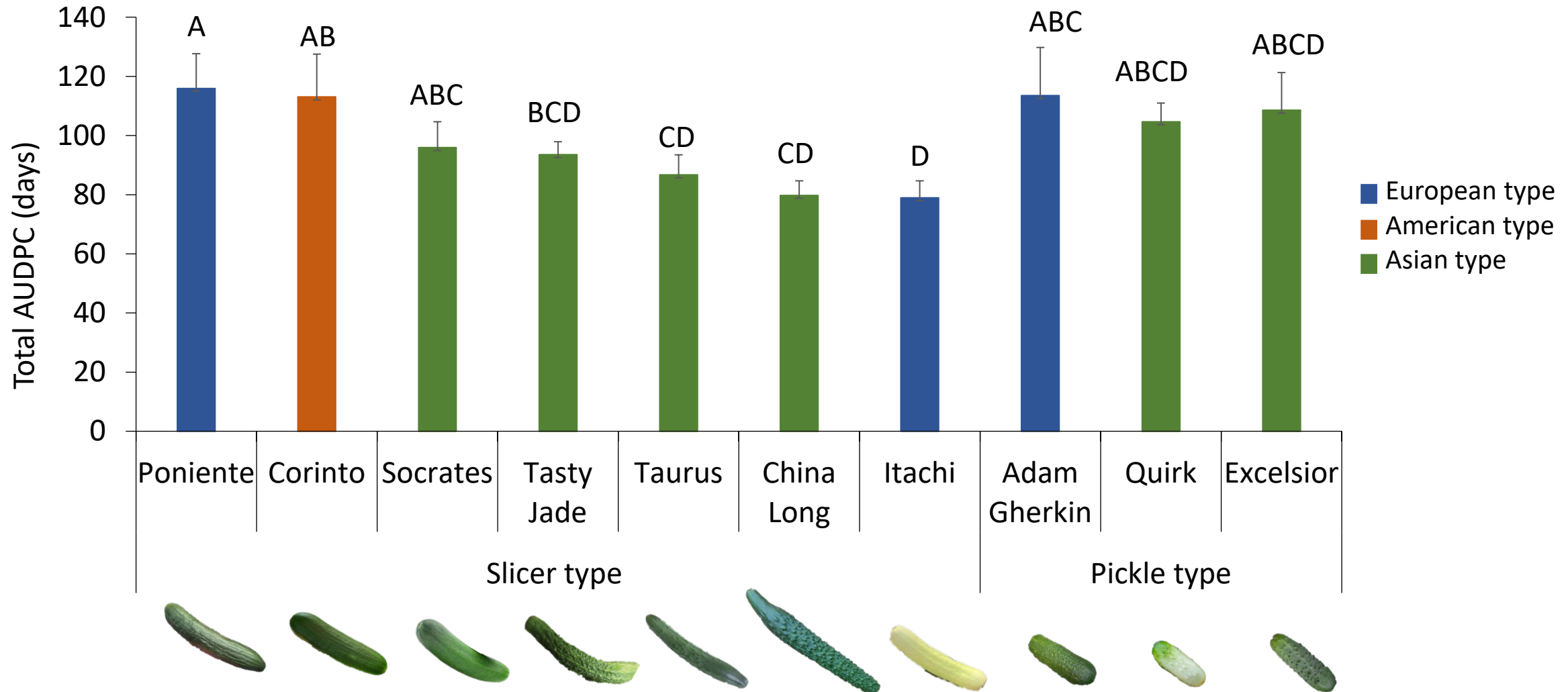
→ Area under Disease Progression Curve:

$$\text{AUDPC} = \sum_{T_X}^{T_0} H - F \text{ rating } [T_1 - T_0] \text{ days}$$

Result:

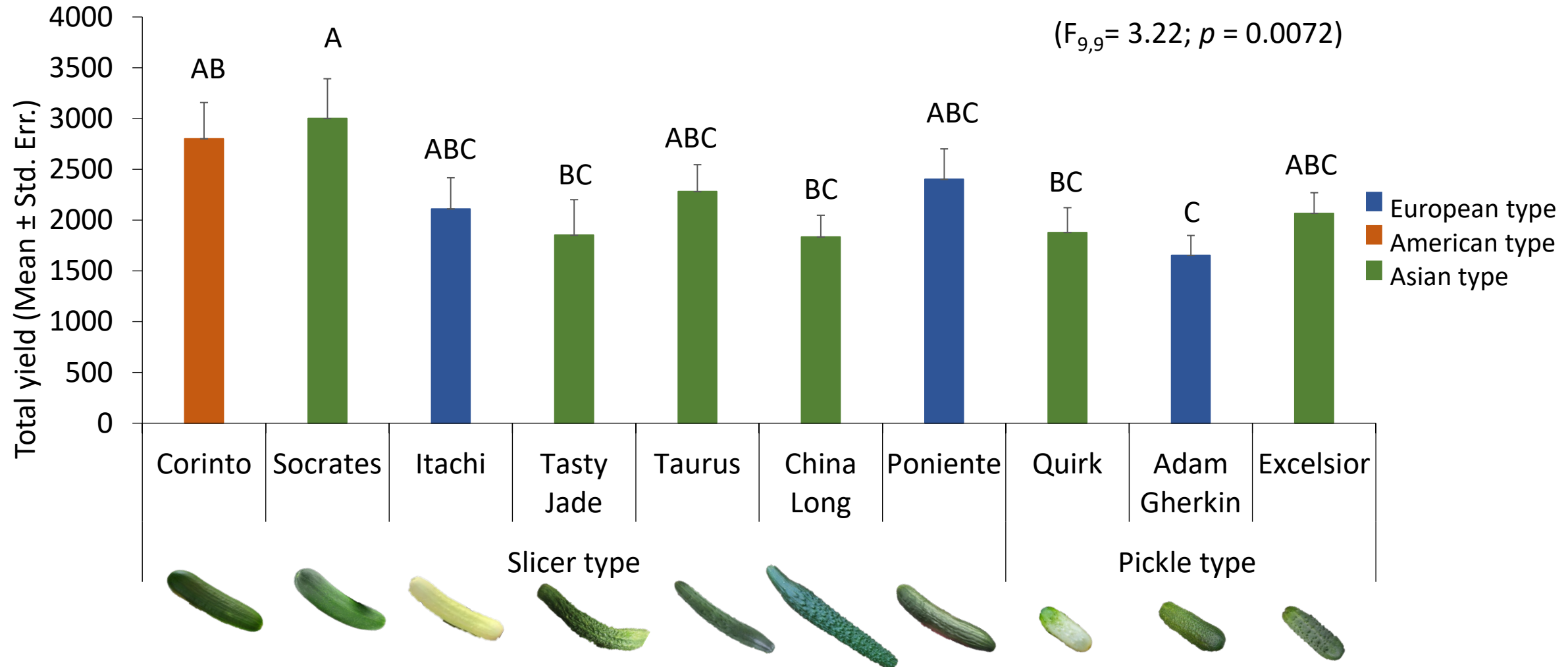
Area Under Disease Progress Curve (AUDPC)

($F_{9,9} = 5.16, p < 0.001$)



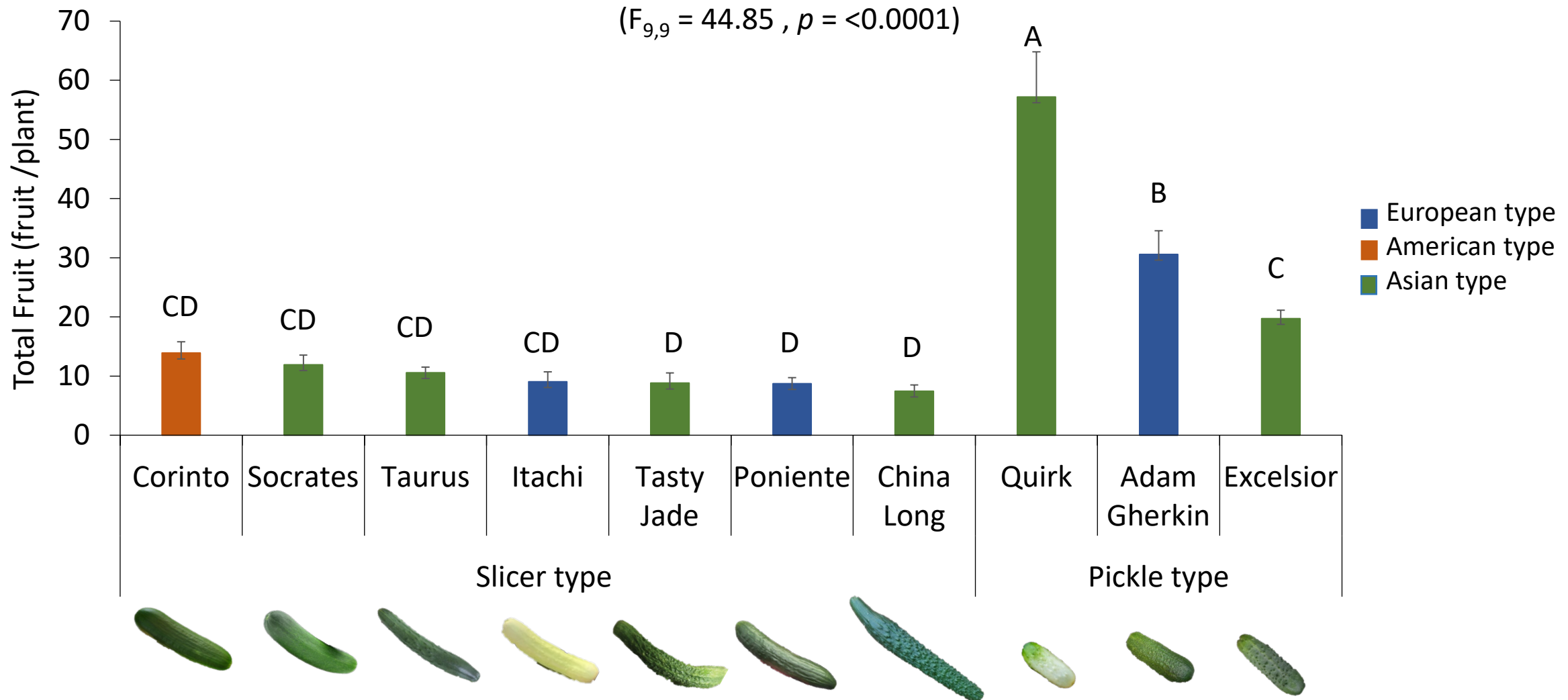
Result:

Total yield



Result:

Number of fruits



Conclusions



- We conclude that Itachi, Taurus and China long cultivar is less susceptible to twospotted spider mite compared to Poniente and Corinto
- We confirmed that Taurus and Tasty Jade are less susceptible to twospotted spider mite (Guan et al. 2019)
- No difference in yield (marketable) among cucumber types (slicer and pickles) to TSSM injury

Future Directions



Examine the traits influencing susceptibility:

- Trichomes density
- Leaf thickness
- Cucurbitacin C
- Total phenolics

Thank you



- To North Central SARE (Sustainable Agriculture research and education)
- To my advisor: Laura Ingwell
- To my lab mates: Allison Zablah, Eze Pojmann, Milena Aguilar, Dr. Sam Willden, Savanna Ploessl, Vanessa Cooper