



Lettuce Variety Evaluation for Tolerance to Pythium Wilt

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Variety Trial for Pythium Wilt Tolerance

- Direct seeded on July 12 at the USDA Research Farm on a site that had significant incidence of Pythium wilt in 2021**
- 53 varieties from 10 seed companies were replicated 4 times in plots 40'' x 25'**
- Plots were visually evaluated on three dates. Lab evaluations: Pythium evaluations (JP Arias) three dates; Fusarium evaluation of selected plants (Alex Putnam) one date; INSV evaluations (Kelley Richardson)**

Seed Companies Participating

| | |
|------------------------|-----------------------------|
| Brinker Orsetti | Rijk Zwaan |
| Enza Zaden | Sakata |
| Greengo | Salinas Valley Seeds |
| Nunhems | Seminis |
| Pinnacle | Vilmorin |

| Company | Variety | Company | Variety | Company | Variety | Company | Variety |
|--------------------|------------|------------|-----------|---------|-------------|-----------------|------------|
| Brinker Orsetti | Kodiak | Nunhems | Nun 00276 | Sakata | Meridian | Seminis | Caracola |
| Brinker Orsetti | BOS 1687 | Nunhems | Nun 00300 | Sakata | Regency | Seminis | Clerac |
| Brinker Orsetti | BOS 1566 | Pinnacle | ICE 101 | Sakata | 7346 | Seminis | Loubressac |
| Brinker Orsetti | Red Fusion | Pinnacle | ICE 102 | Sakata | ROM 1184 | Seminis | Panoramis |
| Brinker Orsetti | BOS 1261 | Pinnacle | ICE 103 | Sakata | Teton | Vilmorin-Mikado | 22PT/01 |
| Enza Zaden Vitalis | Adicamp | Pinnacle | ICE 104 | SVS | Armstrong | Vilmorin-Mikado | 22PT/02 |
| Enza Zaden Vitalis | Telluride | Pinnacle | ICE 105 | SVS | Molera | Vilmorin-Mikado | 22PT/03 |
| Greengo | SR2-21-16B | Pinnacle | ROM 201 | SVS | Paraiso | Vilmorin-Mikado | 22PT/04 |
| Greengo | SR2-21-33B | Pinnacle | ROM 203 | SVS | Primo | Vilmorin-Mikado | 22PT/06 |
| Greengo | Patton | Rijk Zwaan | Salvius | SVS | San Andreas | Vilmorin-Mikado | 22PT/07 |
| Nunhems | Copious | Rijk Zwaan | 1024 | SVS | San Miguel | Vilmorin-Mikado | 22PT/08 |
| Nunhems | Estiada | Rijk Zwaan | 3262 | SVS | SVS 107 | | |
| Nunhems | Momentous | Rijk Zwaan | 3427 | Seminis | Powerball | | |
| Nunhems | Nun 06299 | Sakata | Lockwood | Seminis | SVLC 4050 | | |

Visual Evaluations

- **Counted all plants in each plot**
- **Counted plants that showed visual signs of wilting on three dates: 49, 58 and 62 days after planting**
- **Determined the percent plants infected on each date**

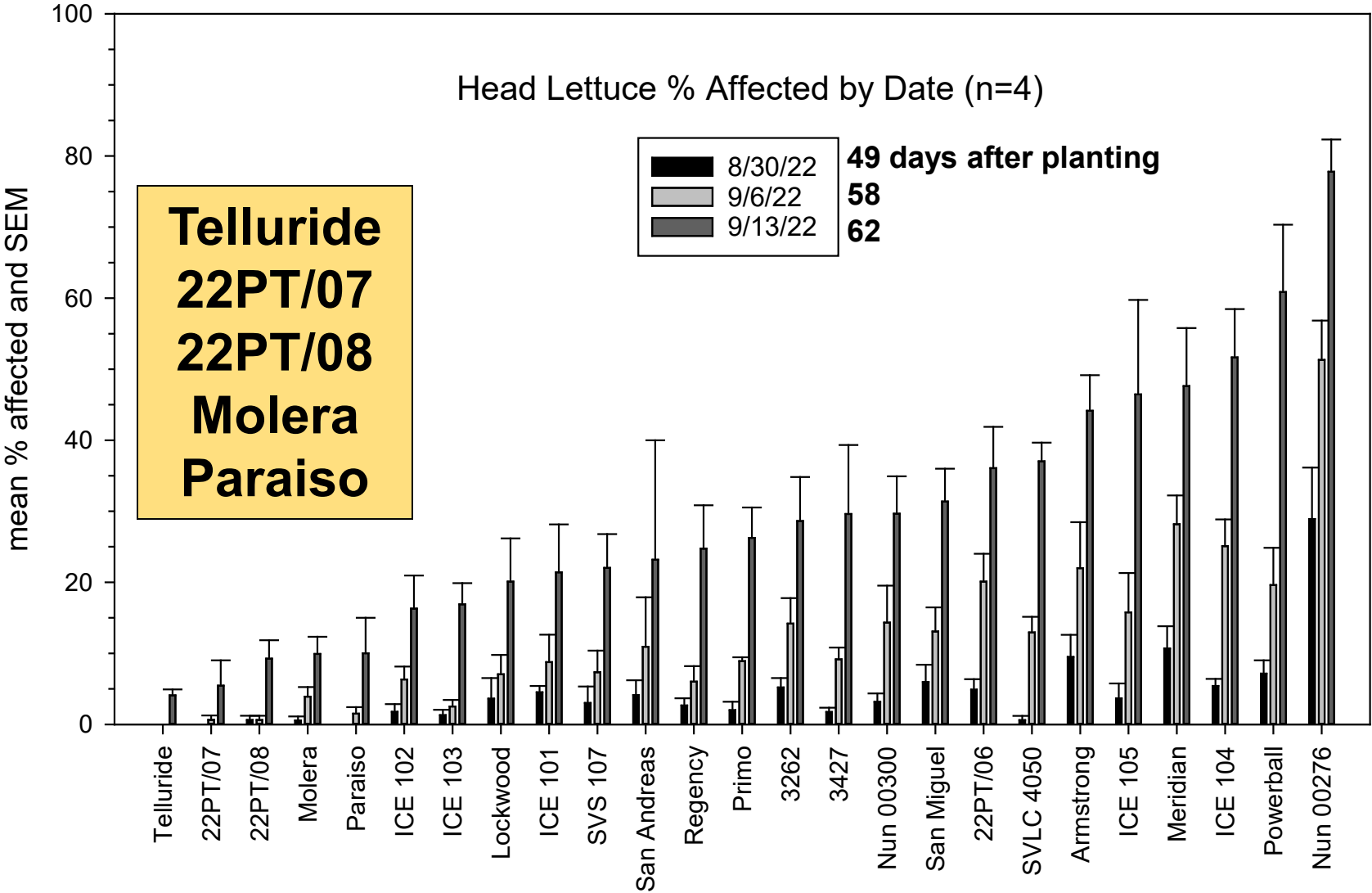


Details on Pathogens Affecting the Varieties in the Trial

- **All varieties from one rep were evaluated for Pythium wilt**
 - **Pythium wilt was consistently isolated from plants that were evaluated**
- **No Fusarium was detected from selected plants evaluated**
- **One sample evaluated by Steve Koike was positive for Verticillium wilt**
- **There was significant INSV in the trial and was evaluated by Kelley Richardson**

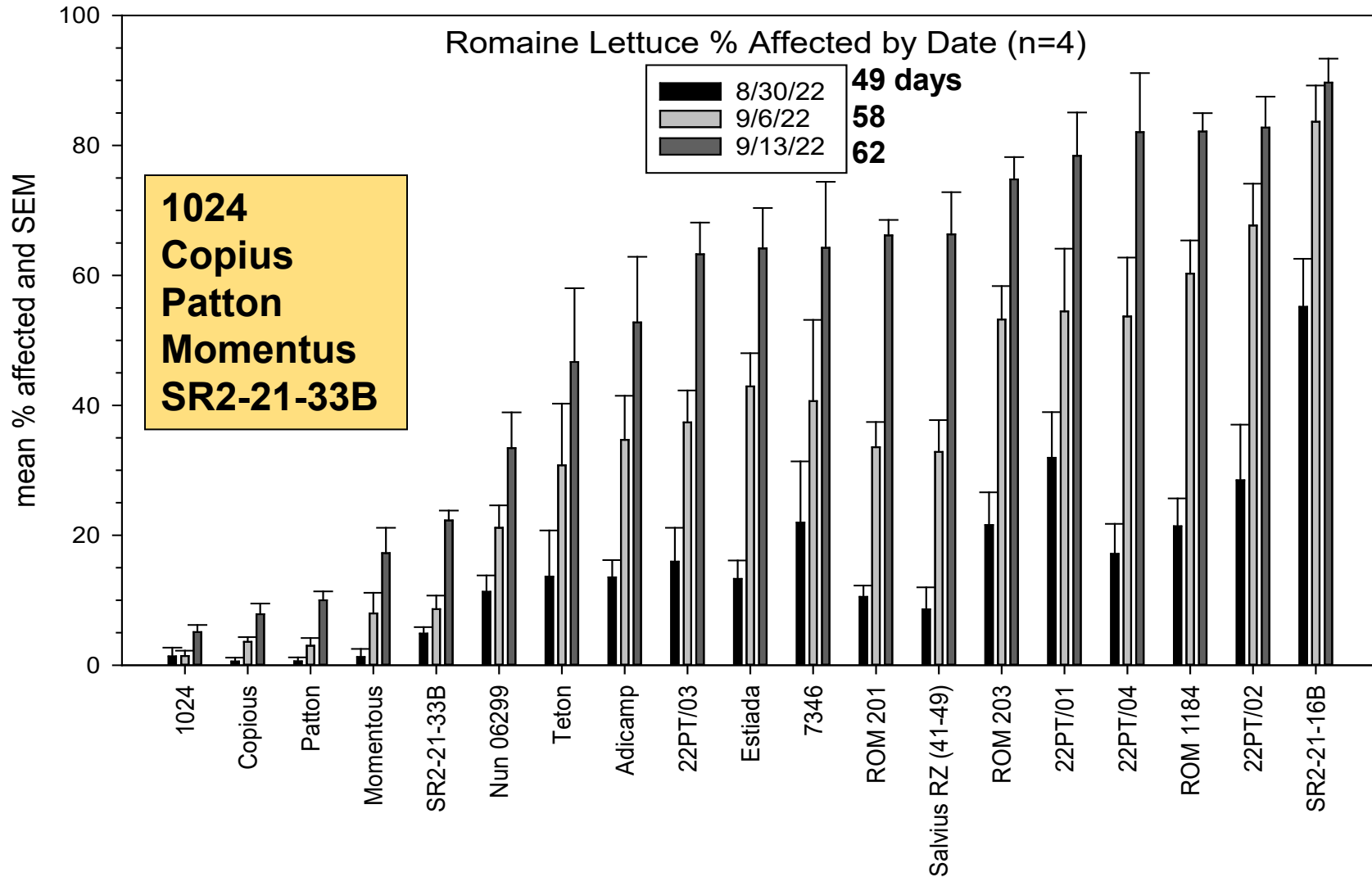
Head Lettuce Field Evaluation

Percent Infected Plants



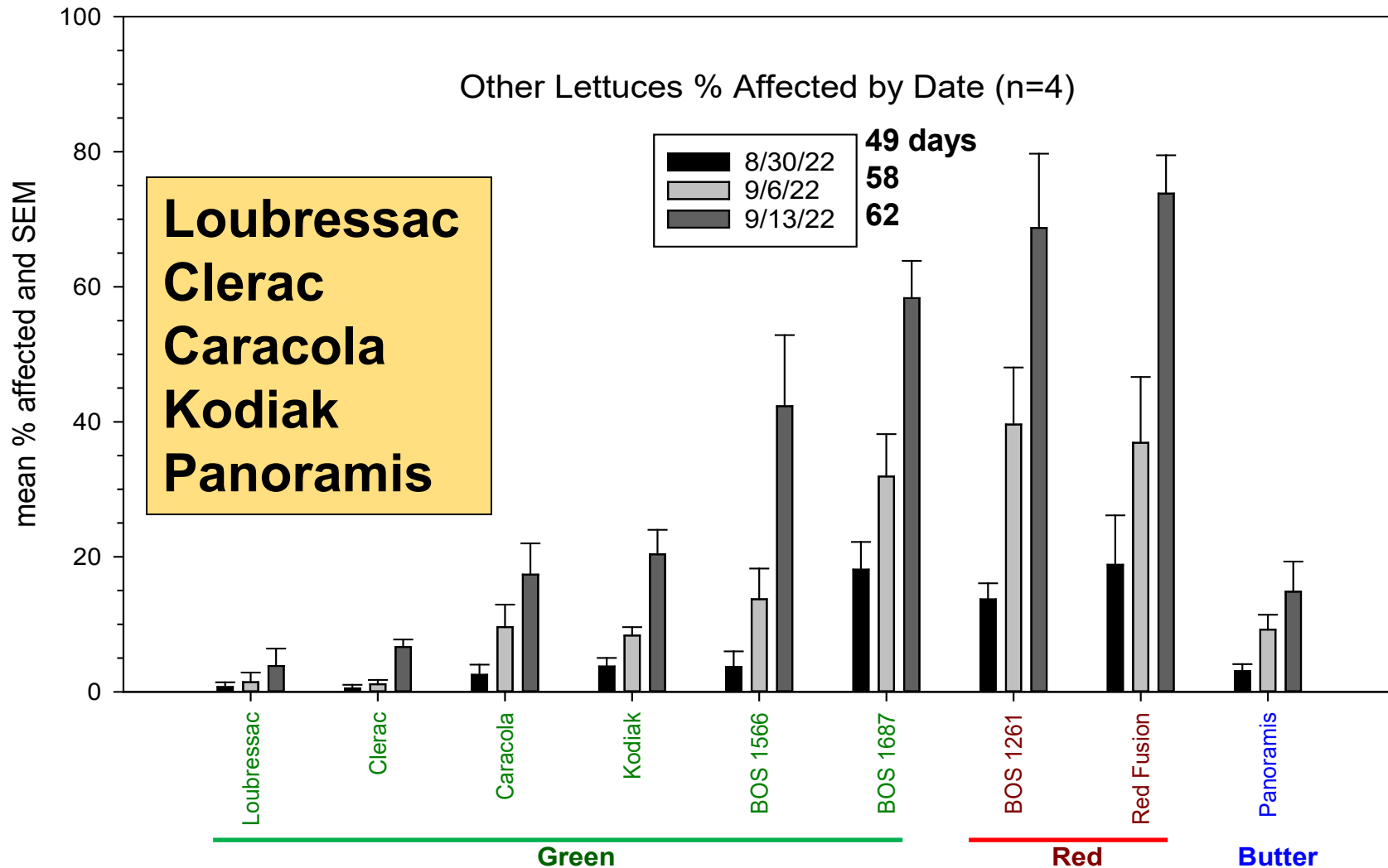
Romaine Field Evaluation

Percent Infected Plants



Other Lettuce Field Evaluation

Percent Infected Plants



Lab Evaluations for Pythium

JP Dundore Arias, CSUMB

- **Evaluated on three dates**
- **Plants sampled in one replication**
 - **First two evaluations were of symptomatic plants only**
 - **Third evaluation included all varieties (symptomatic and asymptomatic)**
- **All varieties tested positive by 58 or 62 days after planting for pythium on the roots (even if they displayed no wilting)**
- **Tolerant varieties tested positive later in the crop cycle and we less severely infected**

Healthy plant tops & rotting on roots

Varieties:

Paraiso, *Head*

Loubressac, *Green*

22PT/08, *Head*

Powerball, *Head*

Clerac, *Green*

Caracola, *Green*

Nun 00300, *Head*

22PT/07, *Romaine*

These varieties were able to carry on in spite of significant infection

Healthy plants & some discoloration on roots

Varieties:

Patton, *Romaine*

Copious, *Romaine*

Telluride, *Head*

1024, *Romaine**

These varieties tested positive for Pythium, but only exhibited discoloration on the roots.

Apparently, the varieties can localize the infection and limit its destructive spread

***This variety has specific tolerance to INSV, but showed tolerance to Pythium as well**

Multiple Evaluations on Growers Fields

- From April to October evaluations were conducted of collapsing plants in grower's fields with various varieties.
- The majority of plants infected with Pythium were also infected with INSV
- Out of all evaluations only 2 had 0% coinfection

Mean of 33 field evaluations

| Percent Dead & wilted | Make up of the dead/wilted ---Percent--- | | | Percent wilt coinfectd with INSV | Percent with INSV only; no wilt | Total plants diseased % |
|-----------------------|---|------------|-------------|--|--|----------------------------------|
| | Pythium | Botrytis | Sclerotinia | | | |
| 30.1 | 74.5 | 6.8 | 19.1 | 74.0 | 4.8 | 35.5 |

Three Grower Field Evaluations

Percent Infected

| Variety | Field 1 | | Field 2 | | Field 3 ¹ | |
|----------------------|-------------|-----------|-------------|-----------|----------------------|------------------|
| | Wilted dead | INSV only | Wilted dead | INSV only | Wilted dead | INSV only |
| Field var. | 50.0 | 41.2 | 78.2 | 8.9 | 68.7 | 15.7 |
| Patton | -- | -- | -- | -- | 42.9 | 25.7 |
| Momentum | 9.1 | 35.2 | -- | -- | 49.3 | 25.4 |
| Copious | 3.6 | 10.9 | -- | -- | -- | -- |
| RZ 1016 ² | 7.6 | 1.1 | 14.5 | 0.4 | 37.6 | 6.9 ³ |
| RZ 1019 ² | 4.6 | 1.8 | 20.4 | 0.8 | 32.0 | 7.0 ³ |
| RZ 1023 ² | 3.6 | 0.9 | 16.9 | 1.2 | 32.5 | 3.3 ³ |

1 – Late fall field

2 – Significant tolerance to INSV

3 – Slight symptoms

Three Grower Field Evaluations

Percent Infected

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| RZ 1023 ² | 3.6 | 0.9 | 16.9 | 1.2 | 32.5 | 3.3 |

These varieties should be included in numerous small plot field evaluations to understand INSV and Pythium wilt pressure in the field

1 – Late fall field
2 – Show Pythium tolerance as well

Variety Evaluation Summary

- **There was significant differences among the the lettuce types in tolerance to Pythium wilt**
- **Pythium tolerant varieties tested positive for Pythium wilt, but the disease showed up later in the crop cycle and only caused discoloration on the roots and was localized**
- **There appears to be less severe Pythium wilt infection with INSV tolerant varieties**

Acknowledgements

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