

Selection progress for reduced Iris yellow spot symptoms on onion

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Introduction

- Iris yellow spot (IYS) disease, caused by *Iris yellow spot virus* (IYSV), can detrimentally impact onion production when disease conducive environmental conditions are present.
- Onion thrips, the virus vector, can be difficult to control under the same environmental conditions.
- Onion germplasm resistant to either issue has not been found.
- Host plant resistance to IYS or reduced thrips feeding preference could reduce the impact of both issues on onion production.

Research Hypothesis

- Plant selection under conducive disease conditions can be effective for reduced IYS symptom development.

Materials and Methods

- Germplasm: Open-pollinated breeding lines selected for reduced IYS symptoms and landrace ‘Stockton Early Yellow’ (SEY).
- Field layout: Bulbs infested with viruliferous thrips placed around study. Thrips attractive cultivar, NuMex Freedom, sown in Oct. to encourage thrips and IYSV spread throughout study (Fig. 1).
- Seed of breeding lines sown in greenhouse in Jan. and transplanted to field in Mar.
- The field arranged as RCBD with 4 replications per entry (Fig. 1).
- Traits measured: Total thrips/plant, leaf number, & IYS rating at 3 dates (Fig. 2). Data collected on same 5-10 plants per plot.
- Individual bulbs weighed at harvest.



Fig.1. Research field at the Fabian Garcia Science Center, Las Cruces, NM

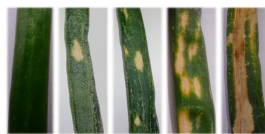


Fig. 2. IYS rating scale (0-4)

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Results

- In both years, plants of NMSU breeding lines exhibited less severe IYS symptoms than plants of SEY early in the season (Fig. 3).
- IYS symptoms were more severe in 2023 than 2022 (Fig. 3).
- In both years, plants of NMSU breeding lines often had fewer thrips/leaf at 8 and 10 WAT than plants of SEY (Fig. 4).
- Thrips numbers/leaf were higher in 2022 than in 2023 at 10 WAT. (Fig. 4).
- Plants of NMSU breeding lines produced a larger bulb size than plants of SEY (Fig. 5).
- Bulb size was generally larger in 2023 than in 2022 (Fig. 5).

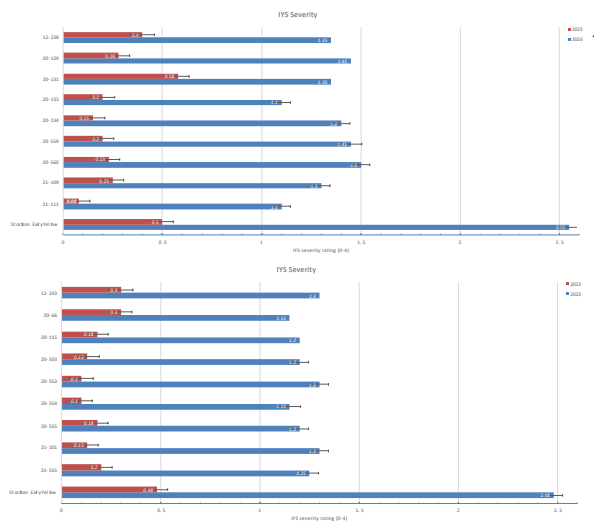


Fig. 3. IYS disease severity at 12 weeks after transplanting (WAT) in 2022 and 2023 for ‘Stockton Early Yellow’ and selections of NMSU 12-238 (A) and 12-243 (B).

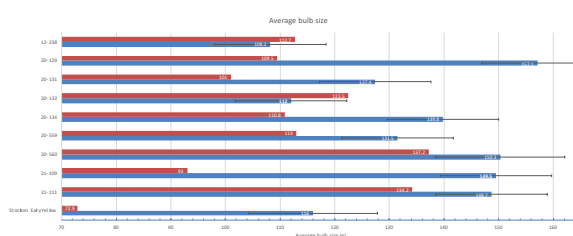


Fig. 5. Average bulb weight at harvest in 2022 (red) and 2023 (blue) for ‘Stockton Early Yellow’ and selections of NMSU 12-238 (A) and 12-243 (B).

Conclusions

- Early in the growing season, plants of NMSU breeding lines exhibited fewer thrips/leaf and less severe IYS symptoms than plants of SEY.
- Under low disease pressure, selection for reduced IYS symptoms appears to be successful.
- Selection for reduced IYS symptoms does not reduce thrips number/leaf.
- Large bulbs can be produced in the presence of high thrips and IYS pressure.

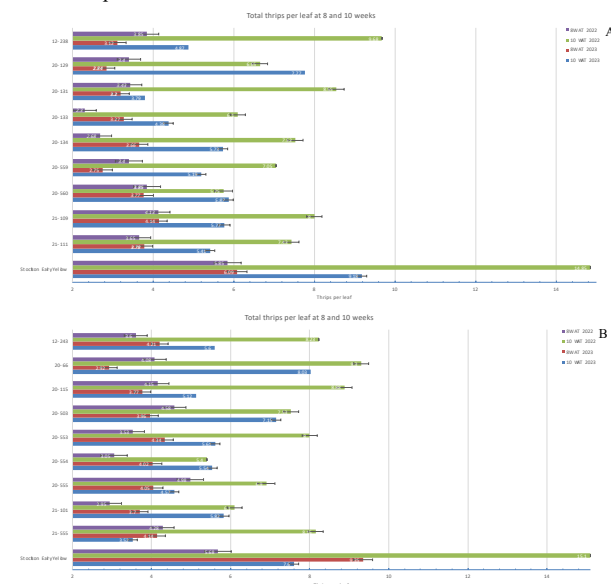


Fig. 4. Total thrips/leaf at 8 and 10 WAT in 2022 and 2023 for ‘Stockton Early Yellow’ and selections of NMSU 12-238 (A) and 12-243 (B).