

IMPACTS OF NITROGEN FERTILIZER IN MUCK

ONION PRODUCTION

Ashley Leach¹, Stephen Reiners², and Brian Nault¹

¹Department of Entomology, Cornell University, Cornell Agritech, 630 W. North St., Geneva, NY 14456, ²Horticulture Section, School of Integrative Plant Sciences, Cornell University, Cornell Agritech, 630 W. North St., Geneva, NY 14456

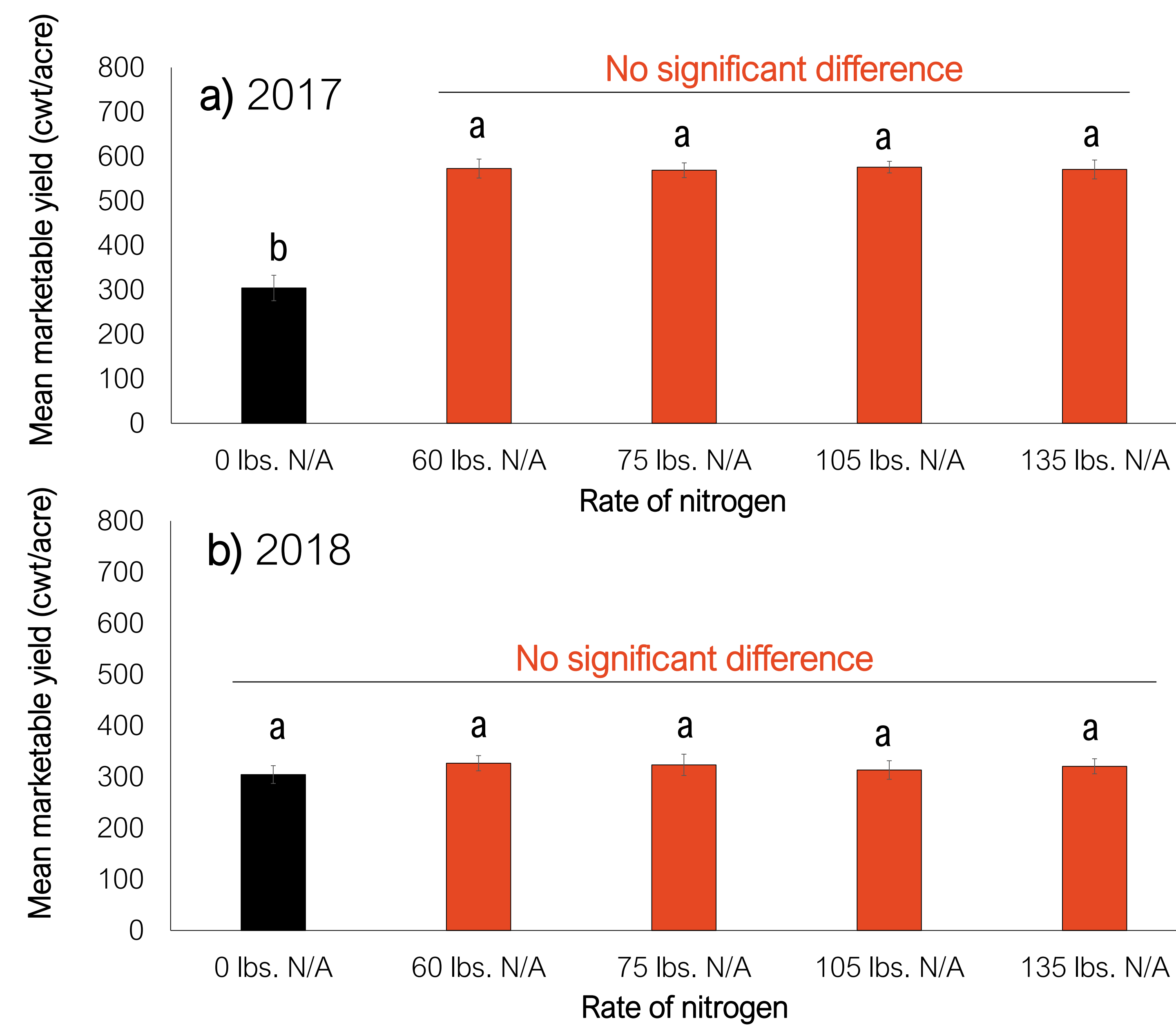
1. Onion yield does not increase with increased rates of nitrogen fertilizer.

Five rates of nitrogen were split-applied in 2017 and 2018 on a commercial muck onion farm with cv. 'Bradley':

1. 0 lbs. N/A at planting
2. 60 lbs. N/A at planting
3. 60 lbs. N/A at planting + 15 lbs. N/A at 3-5 leaves (75 lbs. N/A)
4. 60 lbs. N/A at planting + 45 lbs. N/A at 3-5 leaves (105 lbs. N/A)
5. 60 lbs. N/A at planting + 75 lbs. N/A at 3-5 leaves (135 lbs. N/A)

Consistently, onion plants fertilized with nitrogen have similar marketable yields (Figure 1a and 1b). In 2017, Plants treated with nitrogen had 66% greater marketable yields as compared to unfertilized onion plants, but all onions supplemented with nitrogen had statistically similar yields. In 2018, plants had similar yields regardless of nitrogen rate applied.

Figure 1 (right): Onion marketable yield (cwt/acre) in 2017 (a) and 2018 (b) within 5 rates of nitrogen. Onions with split applications of nitrogen were fertilized with additional nitrogen in June. Onions were planted in mid-April on 'muck' soil types in Elba, NY. Onions were harvested, cured for one week, and then weighed and graded.



2. Onion thrips infestations are not impacted by nitrogen fertilizer.

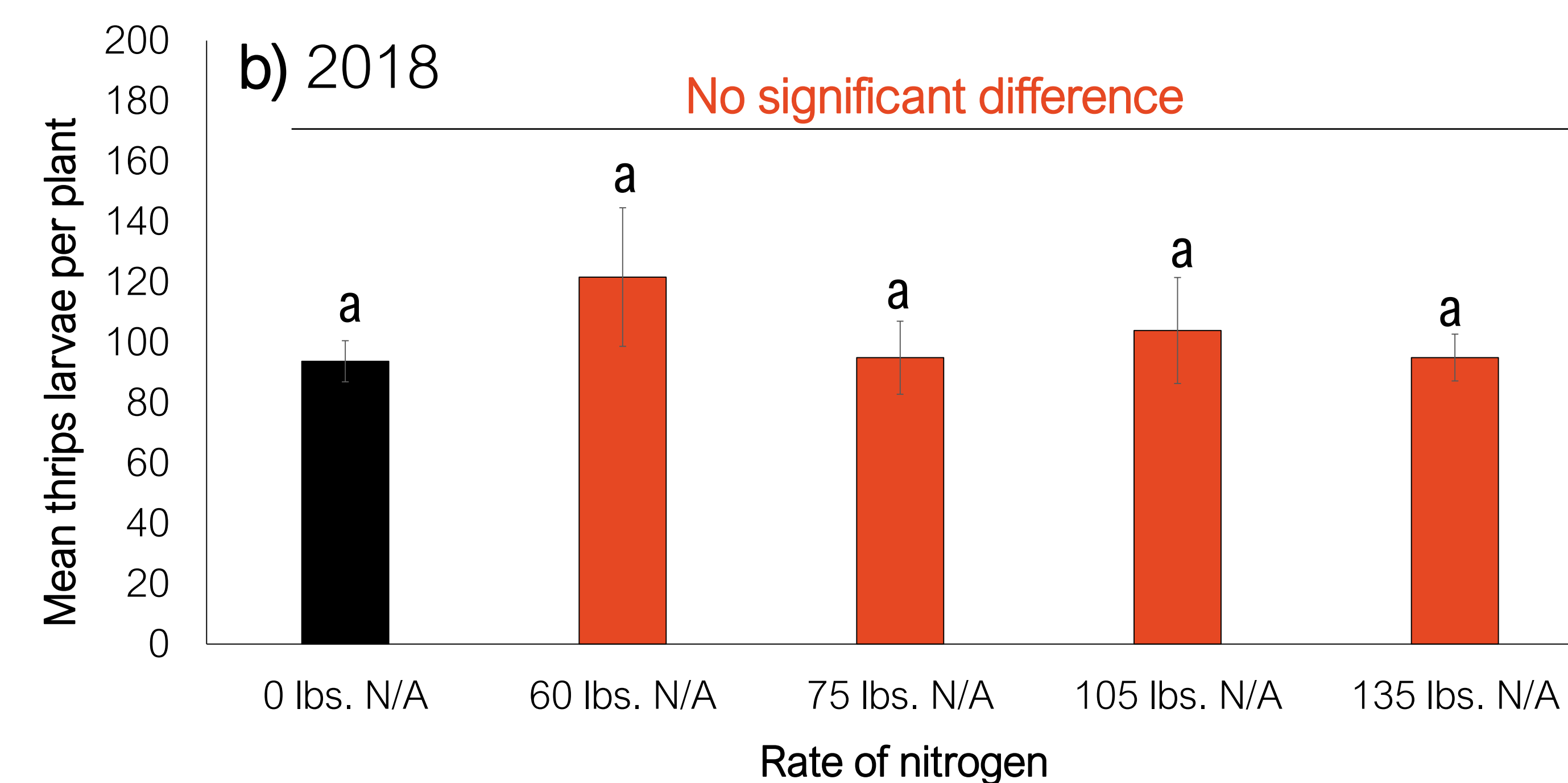
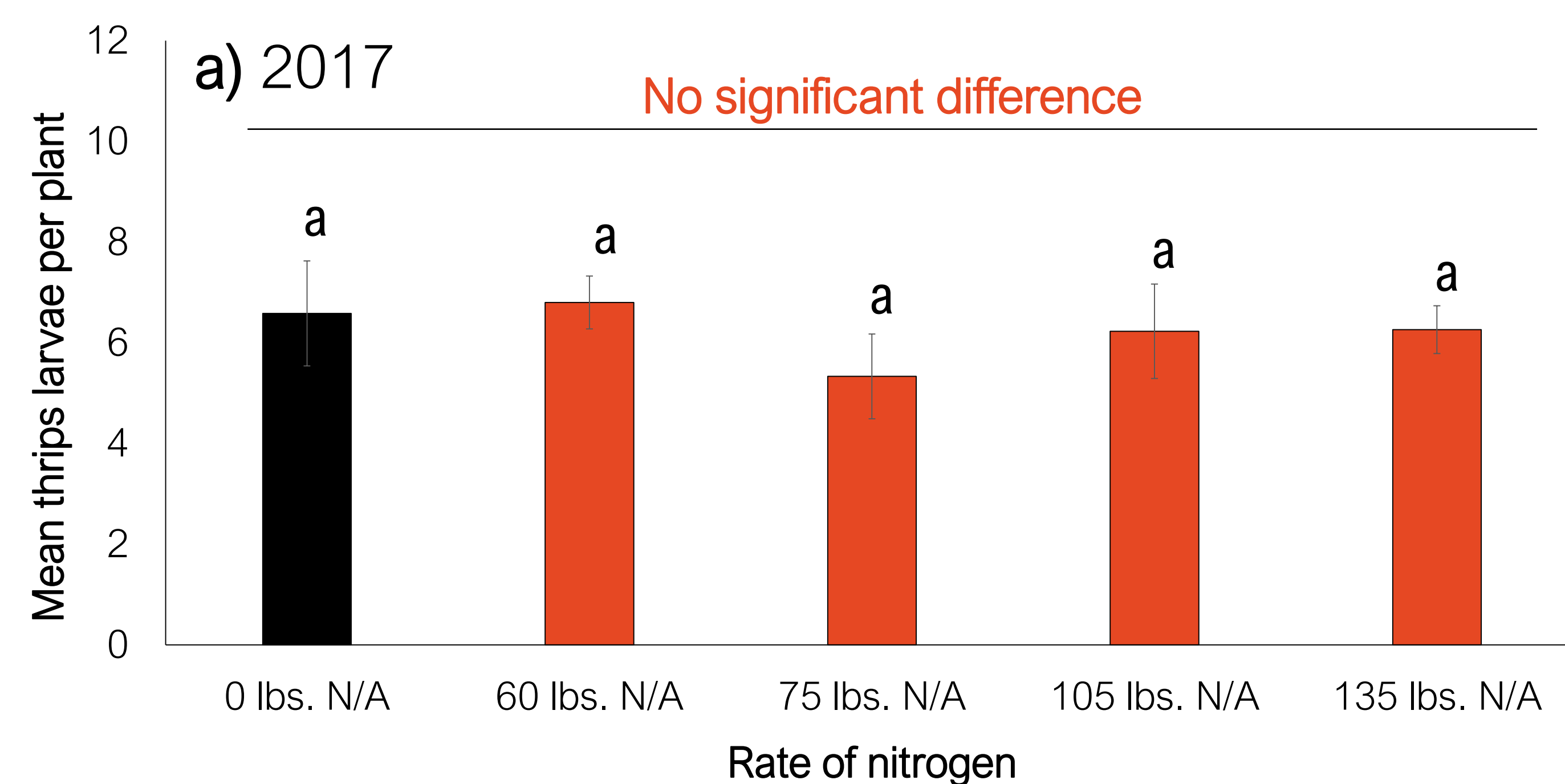


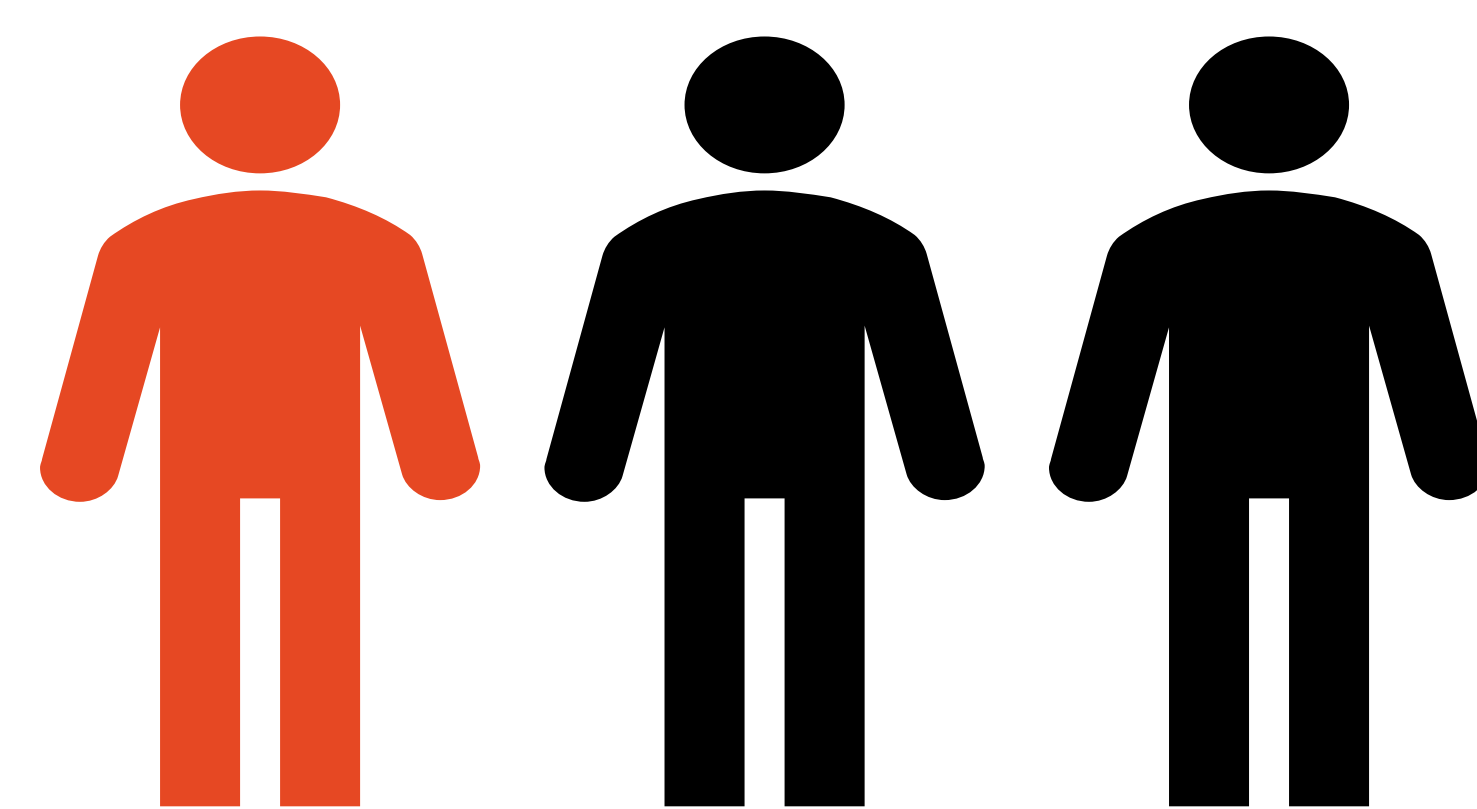
Figure 2 (above): Seasonal onion thrips larvae per plant in 2017 (a) and 2018 (b) within 5 rates of nitrogen in 'Bradley'. Onions with split applications of nitrogen were fertilized with additional nitrogen in June. Onions were planted in mid-April on 'muck' soil types in Elba, NY. Onions thrips were counted on a weekly basis throughout the growing season on 20 plants per plot.

Onion thrips are significant pests of onion, and we have not observed a season-long advantage of reducing nitrogen to reduce onion thrips infestations. Seasonal onion thrips larvae per plant is statistically similar between all nitrogen rates tested in 2017 and 2018 (Figure 2a and b).

NITROGEN IN NY ONION PRODUCTION

60 lbs. N/A

Our recommended rate of nitrogen for onion production



1 in 3 New York onion growers have reduced their rates of nitrogen and apply less than 60 lbs. N per acre.

3. Incidence of bacterial bulb rot increases with increased nitrogen fertilizer.

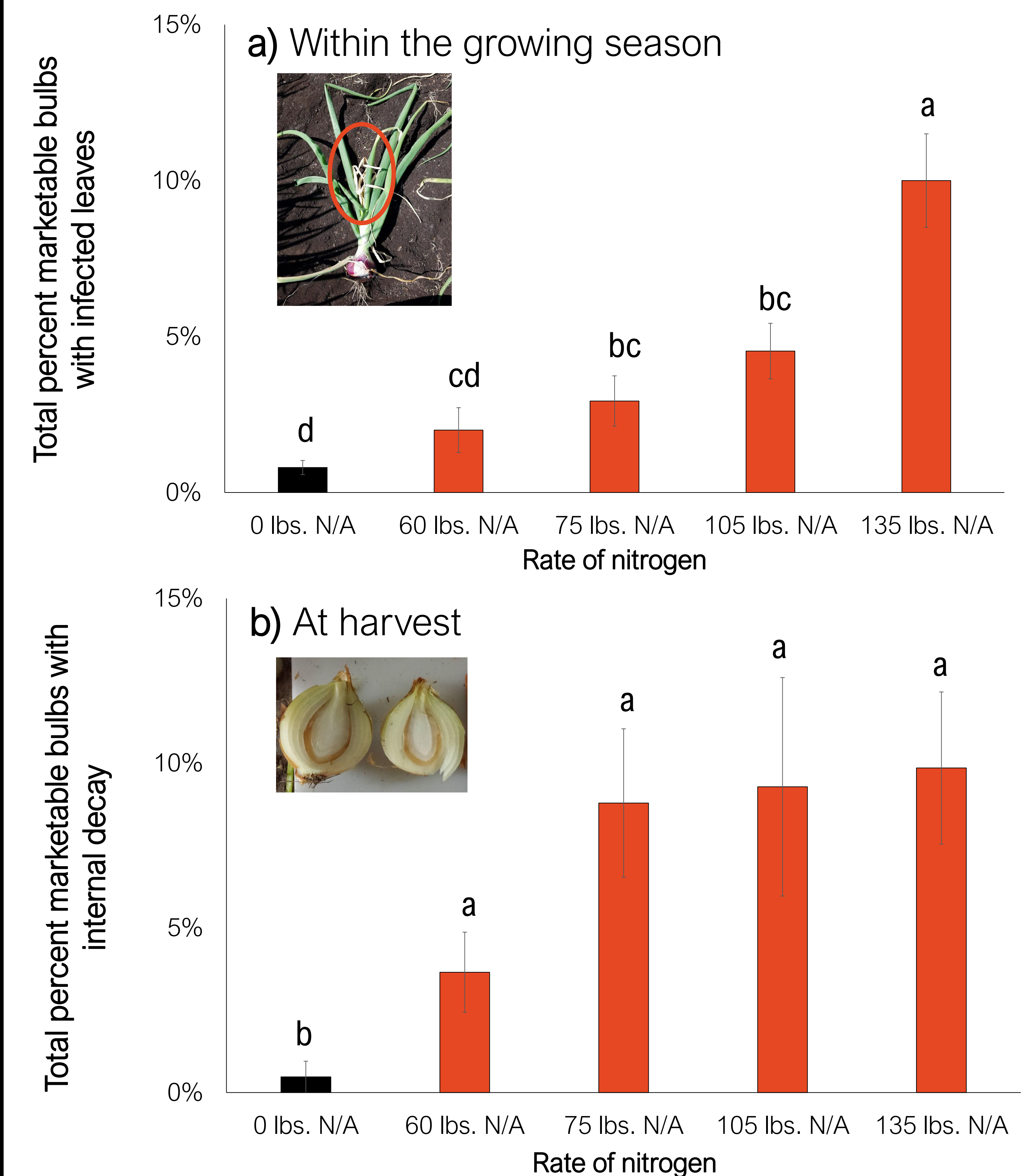


Figure 3 (above): Total percent onions with bacterial rot symptoms during the growing season (a) and at harvest (b) within differing rates of nitrogen in 'Bradley'. During the growing season (a), plots were examined for bacterial rot symptoms on two dates, 29 Jul 2017 and 16 Aug 2017. Any plant with wilted inner leaves (characteristic of *Pantoea* spp. infection) was considered to have bacterial bulb rot (image inset). At harvest (b), a subsample of marketable bulbs ('Standard' and 'Jumbo' size grades) were longitudinally cut open at harvest to determine if the bulb was decaying (image inset).

In 2017, nitrogen fertilizer significantly impacted the percentage of onion bulbs with bacterial decay during the growing season and at harvest (Figure 3). Plots that received nitrogen fertilizer had approximately 3 times the amount of bacterial rot as compared to those plots that did not receive any fertilizer.

ACKNOWLEDGEMENTS

Thank you to Mortellaro farms for allowing us to conduct this research on their farm. Thank you to the numerous research assistants that have collected data over the past 2 years. This research was funded by NE-SARE GNE16-126.

