

Effect of Nitrogen Fertilization on Fresh Fruit Keeping Quality

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Effect of N Fertilization on FF KQ

Objectives

Evaluate the effect of nitrogen fertilization on the quality of fruits at harvest and after up to 12 weeks in storage in conventional and organic farms:

- Defective fruits
- Fruit rot
- Insect damage
- Fruit size
- Fruit color
- Yield



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Protocol

- Fruits were harvested from Laval University experimental plots on sandy soil from a research project on cranberry fertilization.
- The treatments of interest for this trial were 0, 13, 27, 40 and 54 lbs N/acre (0, 15, 30, 45 and 60 kg N/ha). The plots had been fertilized with these amounts of nitrogen for the last three years.
- The nitrogen sources were ammonium sulfate (21-0-0) for the conventional sites and amino acid solutions in the organic farm (8-0-0 for the 1st year and 6-1-1 for the 2nd and 3rd years).



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- The nitrogen fertilization was split in four applications: 15% at 10-20% bloom; 35% at 50% bloom; 35% at 50% out of bloom and 15% one week later.
- Each of these plots also received 30 lbs P_2O_5 /acre, 85 lbs K_2O /acre, 10 lbs of Mg/acre, 1.8 lbs Cu/acre and 0.9 lbs B/acre every year.
- The variety was Stevens.
- Each treatment was replicated twice on each of 3 conventional sites (1 X Laurierville, 2 X Notre-Dame-de-Lourdes) and 1 organic site (Saint-Louis-de-Blandford).



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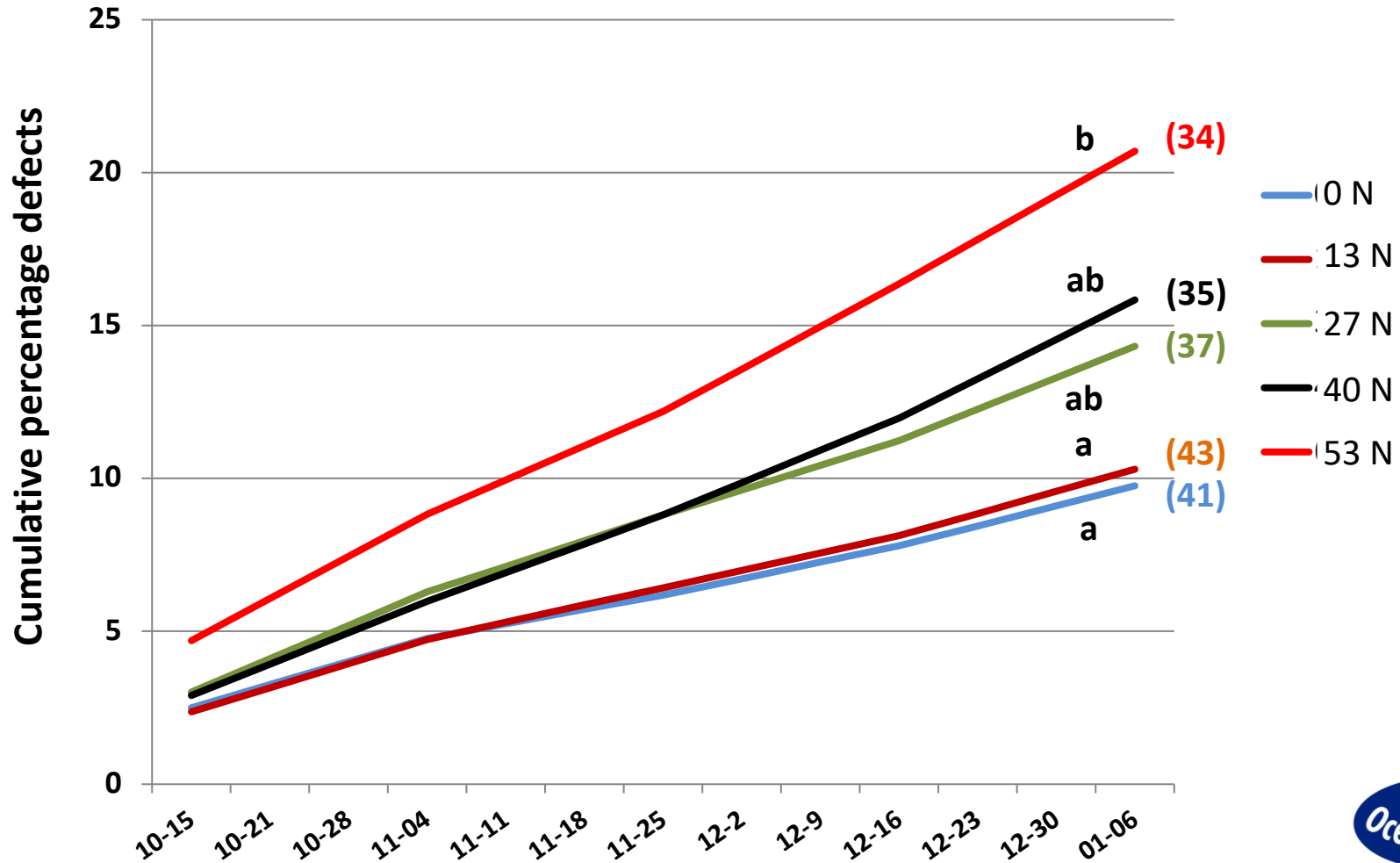
Protocol

- Five pounds of fruits from each plot were harvested on October 8th and 12th and were put in a cardboard box. They were kept at a storage temperature of 6°C (42°F) for a period of 12 weeks.
- At harvest, and after 3, 6, 9 and 12 weeks, the fruit quality was evaluated. The defective fruits were classified as bruised, scarred, soft or decayed, injured by insects and undersized and were then counted and weighed.



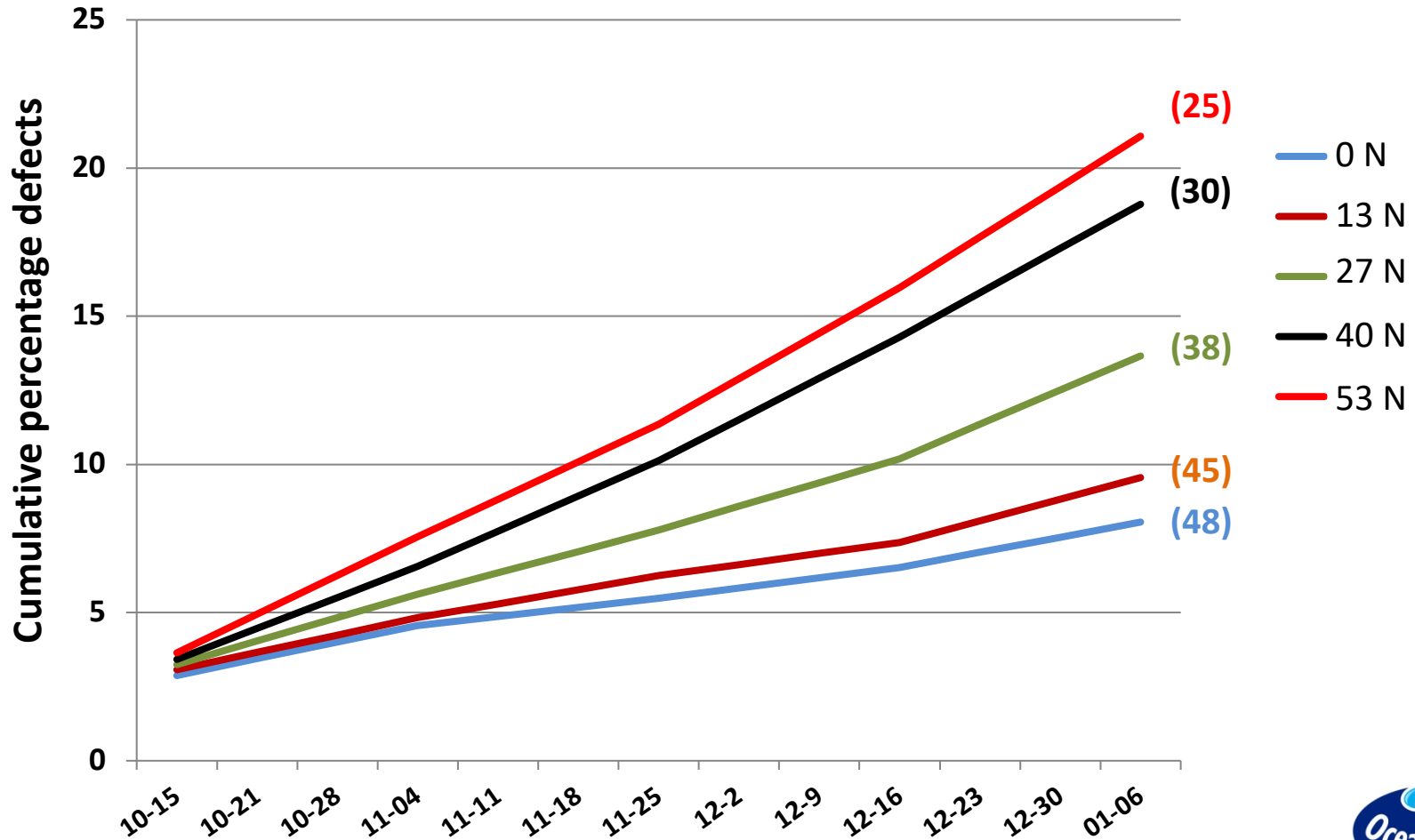
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Results: Defects Conventional



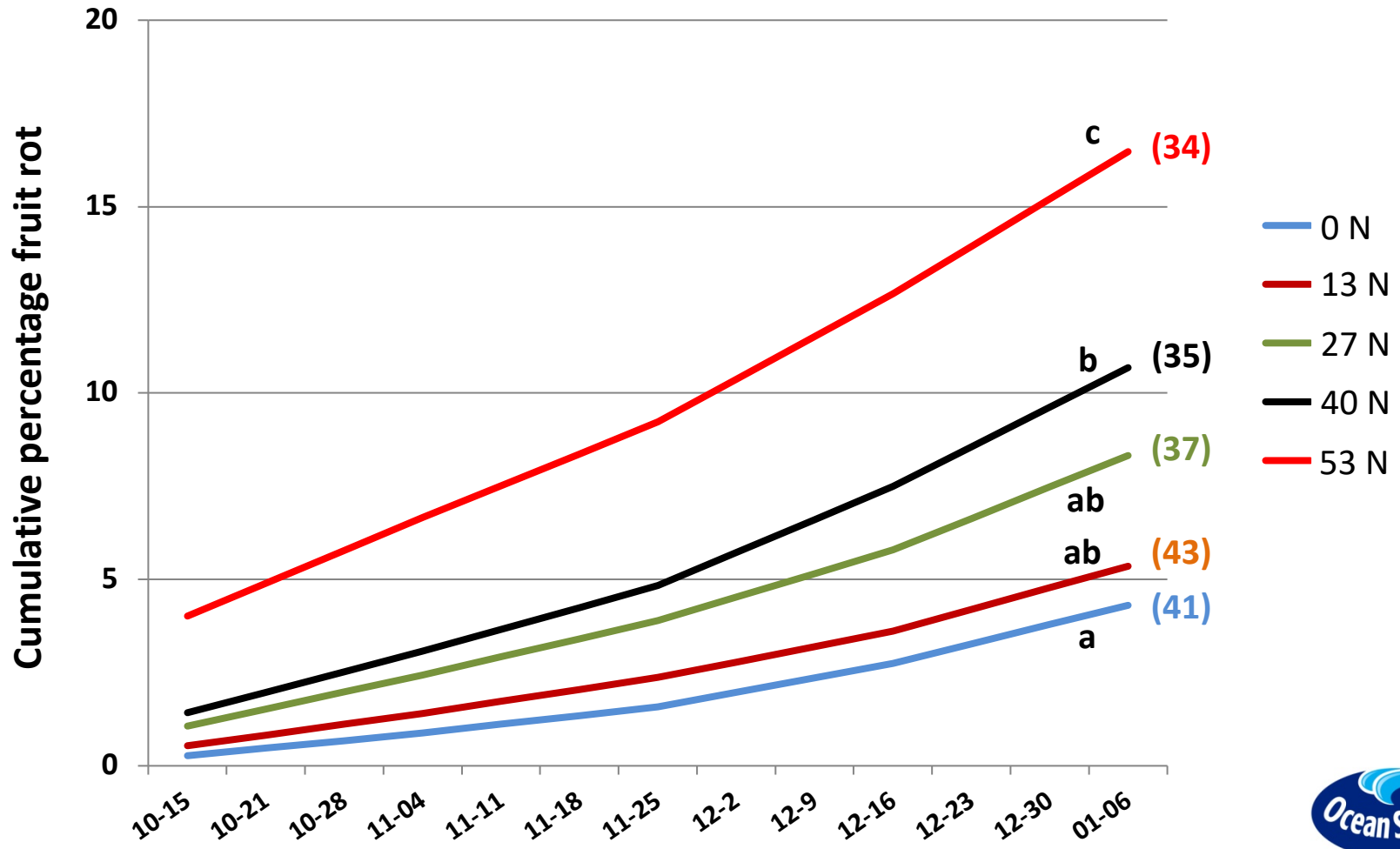
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Results: Defects Organic



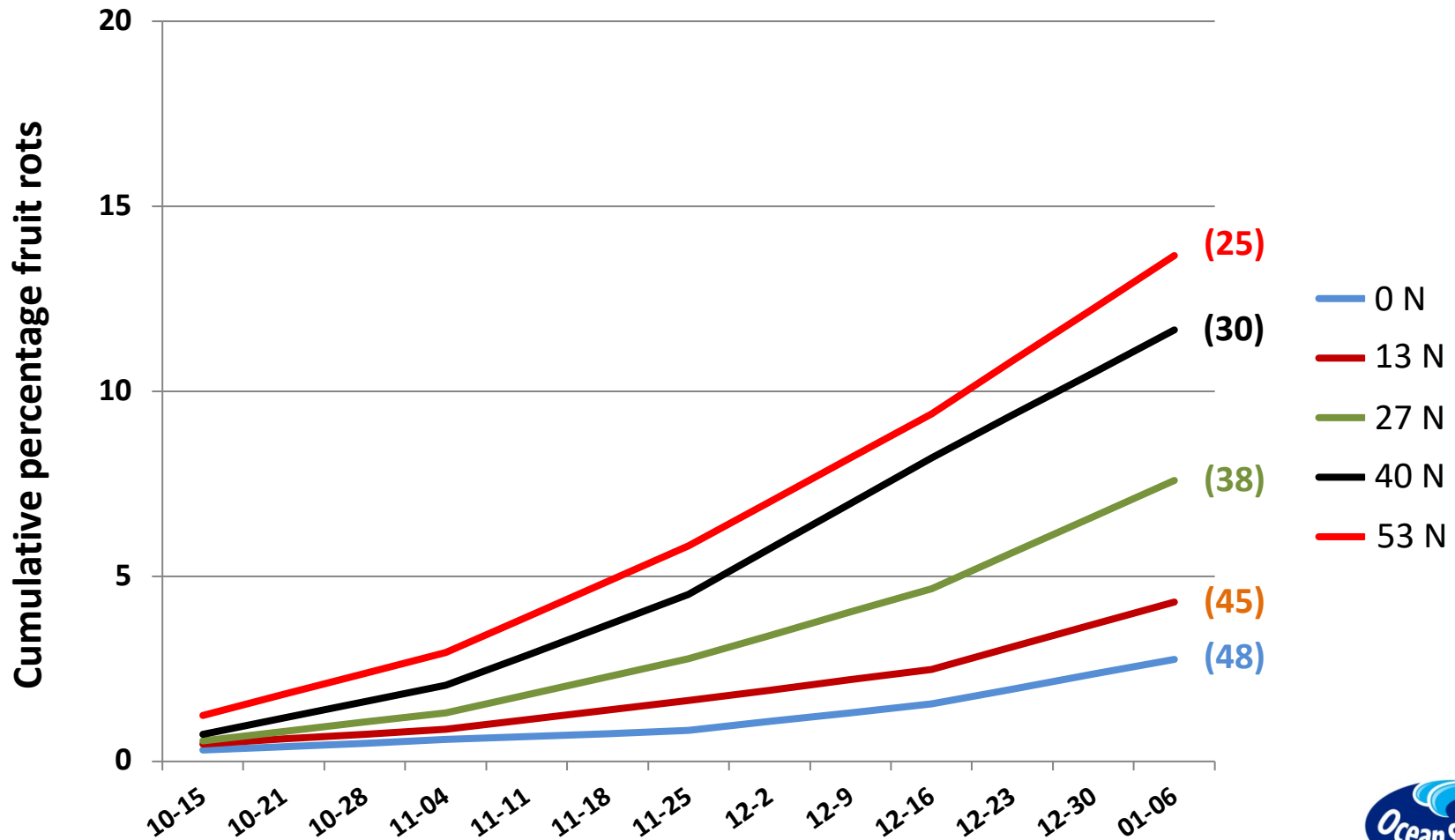
Effect of N Fertilization on FF KQ

Results: Fruit Rot Conventional



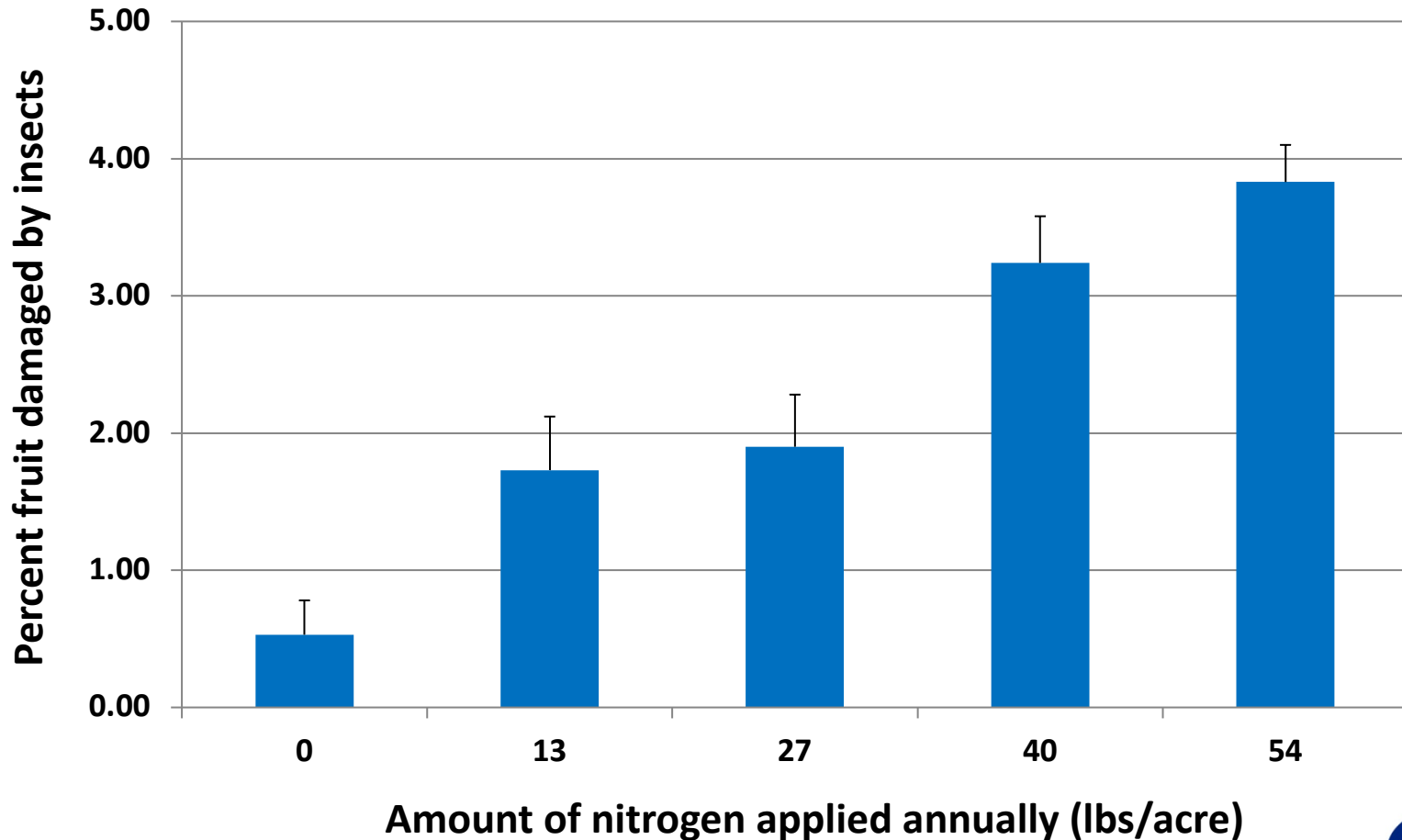
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Results: Fruit Rot Organic



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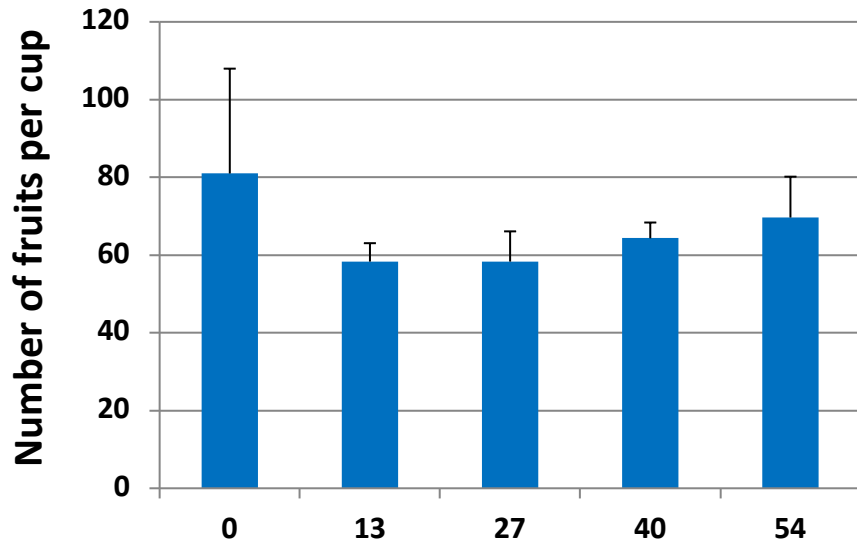
Results: Insect Damage Organic



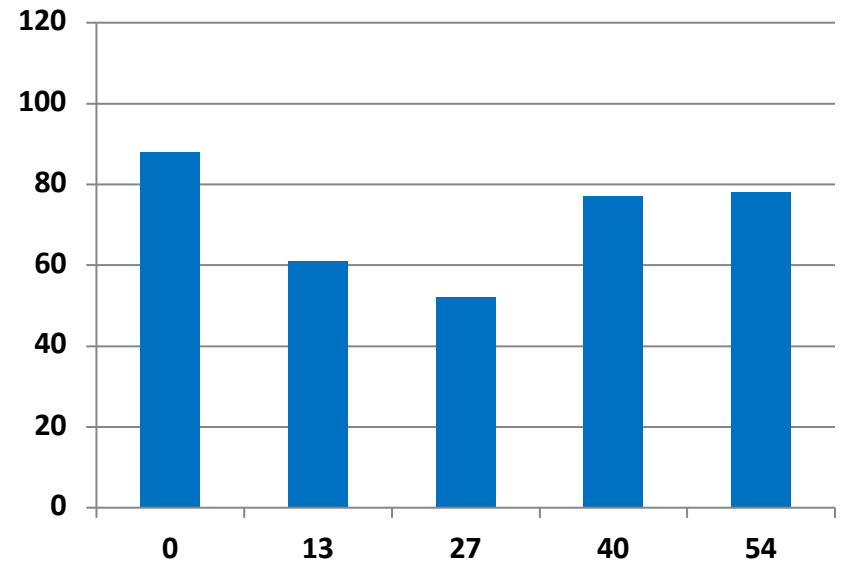
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Results: Fruit Size

Conventional



Organic



Amount of nitrogen applied annually (lbs/acre)

The % of small berries (<13/32") was significantly higher in plots having received no nitrogen

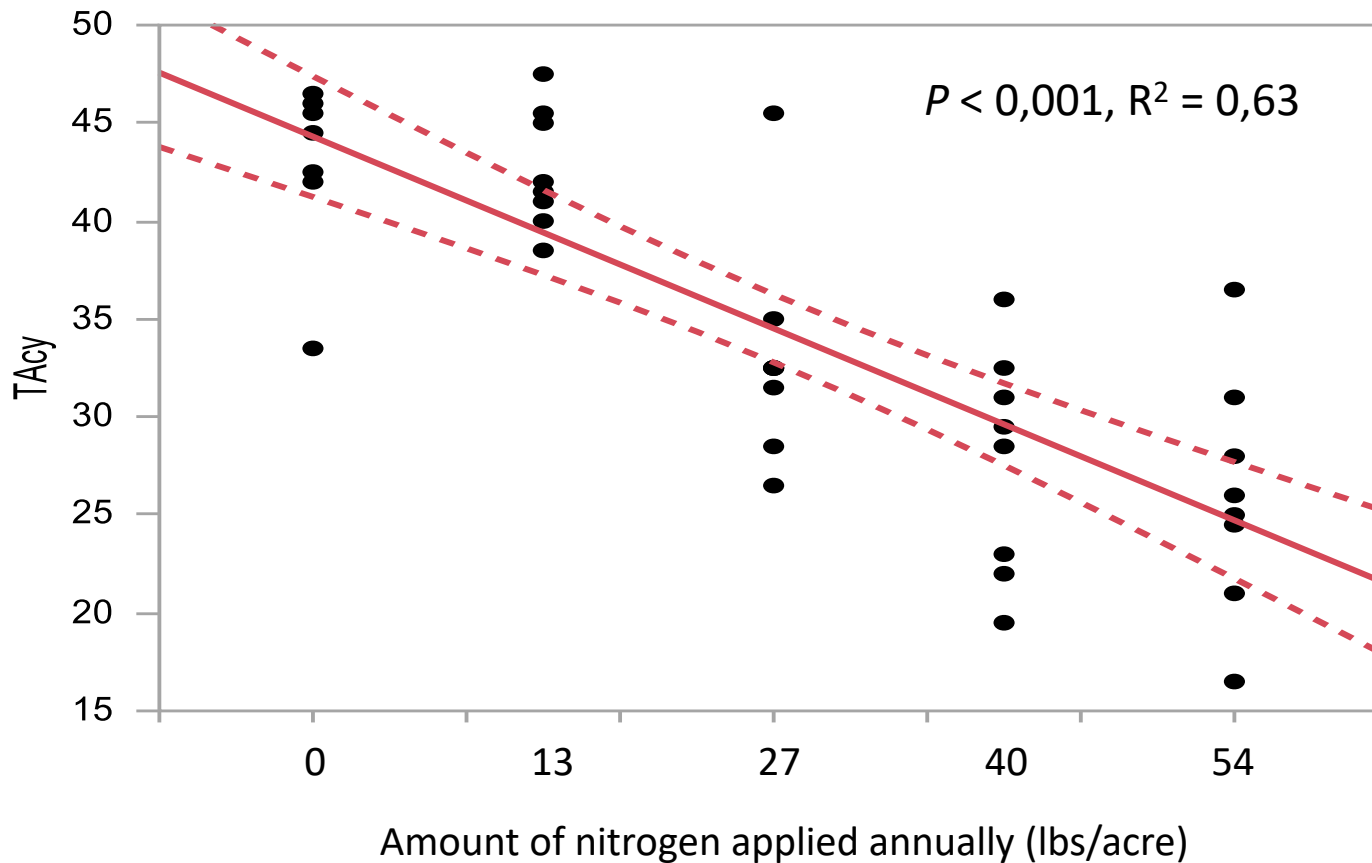
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Results: Fruit Color



Effect of N Fertilization on FF KQ

Results: Fruit Color

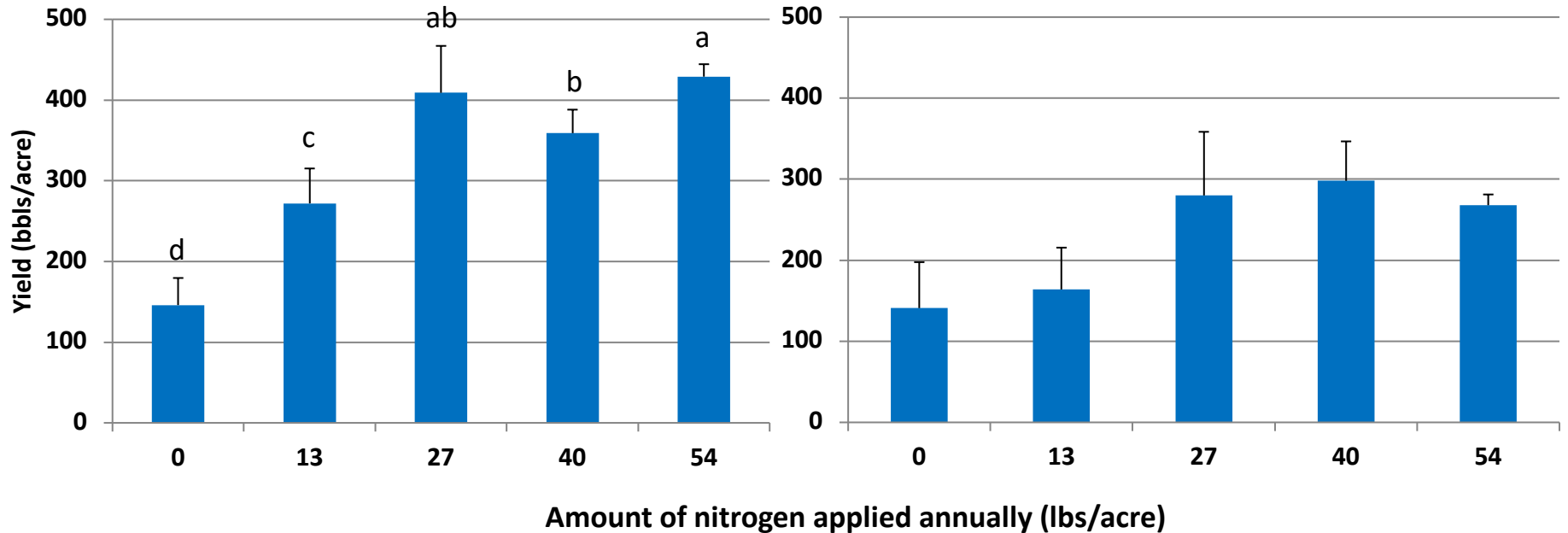


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Results: Yield

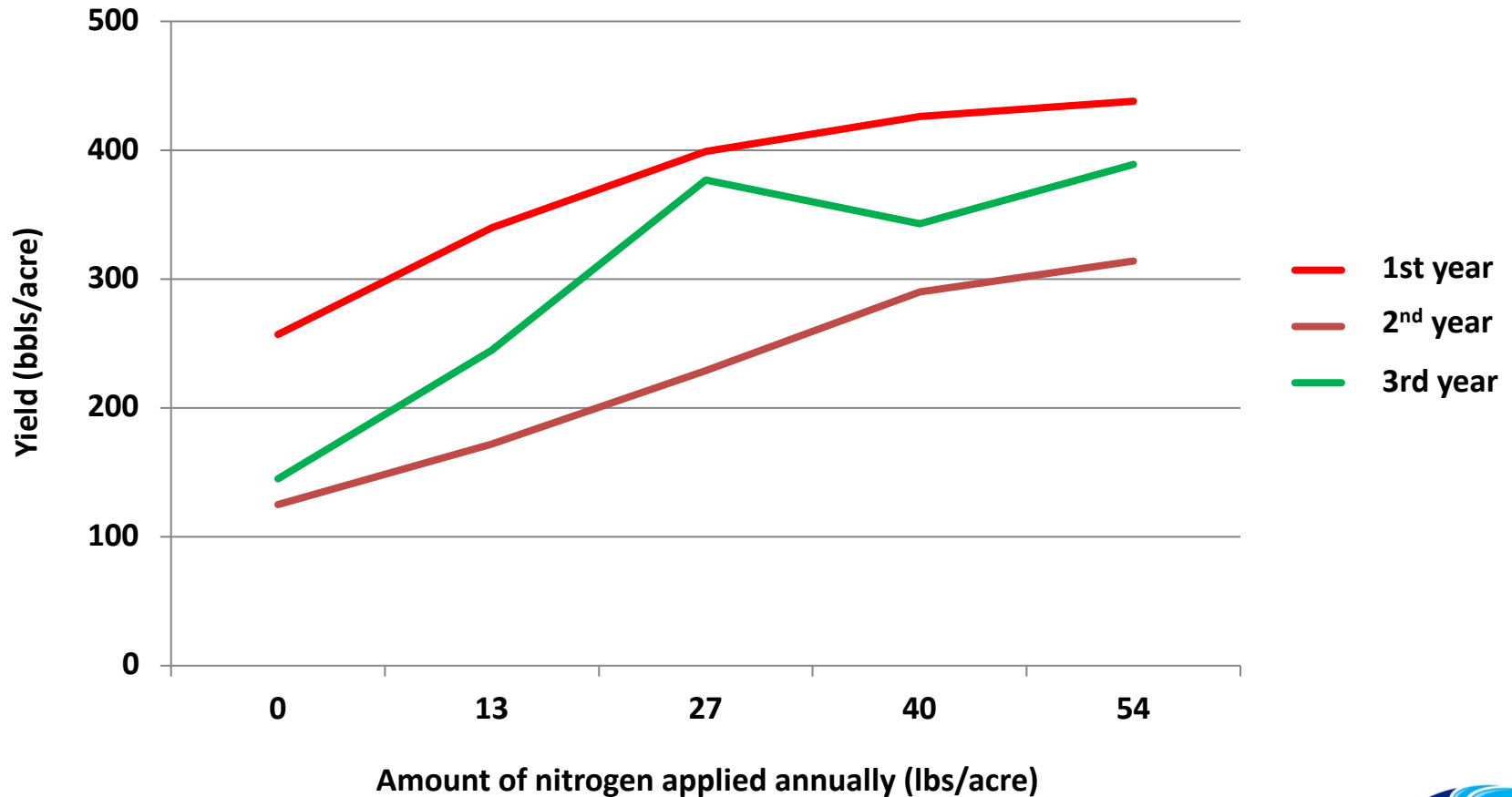
Conventional sites

Organic site



Effect of N Fertilization on FF KQ

Results: Yield



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Conclusion

- Nitrogen fertilization had an effect on fresh fruit keeping quality. As nitrogen fertilization increased, the keeping quality decreased.
- The main factor explaining the effect on keeping quality is fruit rot. As nitrogen fertilization increased, fruit rot increased.
- Nitrogen fertilization had an effect on fruit color uniformity and TAcy. As the nitrogen fertilization increased, the fruit color uniformity and TAcy decreased.



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Conclusion

- Nitrogen fertilization had an effect on yield. The increase in nitrogen fertilization usually resulted in an increase in yield, with the biggest increase occurring up to a fertilization of 27 to 40 lbs of nitrogen/acre.
- Based on this project, considering the effect on quality and on yield of nitrogen fertilization of fresh fruits, an annual fertilization of 27 to 40 lbs of nitrogen/acre should be recommended on sandy soil in Quebec.



Thanks to

- Laval University
- Les Atocas de l'Érable
- La Cannebergière
- Atocas Blandford
- Mont Atoca

