



β -Glucan, Oil, and Protein of Oats as Affected by Variety, Location, and N Application

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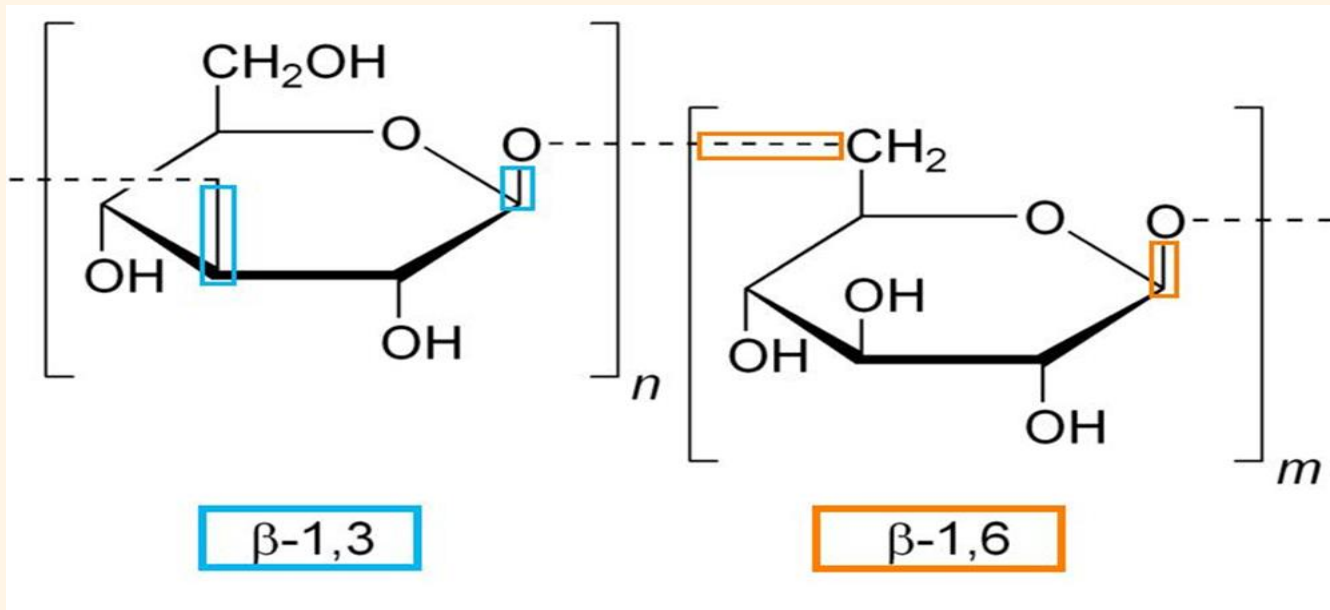
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Outline

- General introduction of N fertility effects on oat production and yield
- Objectives of testing varietal responses to N
- Major findings across locations
- Concluding remarks

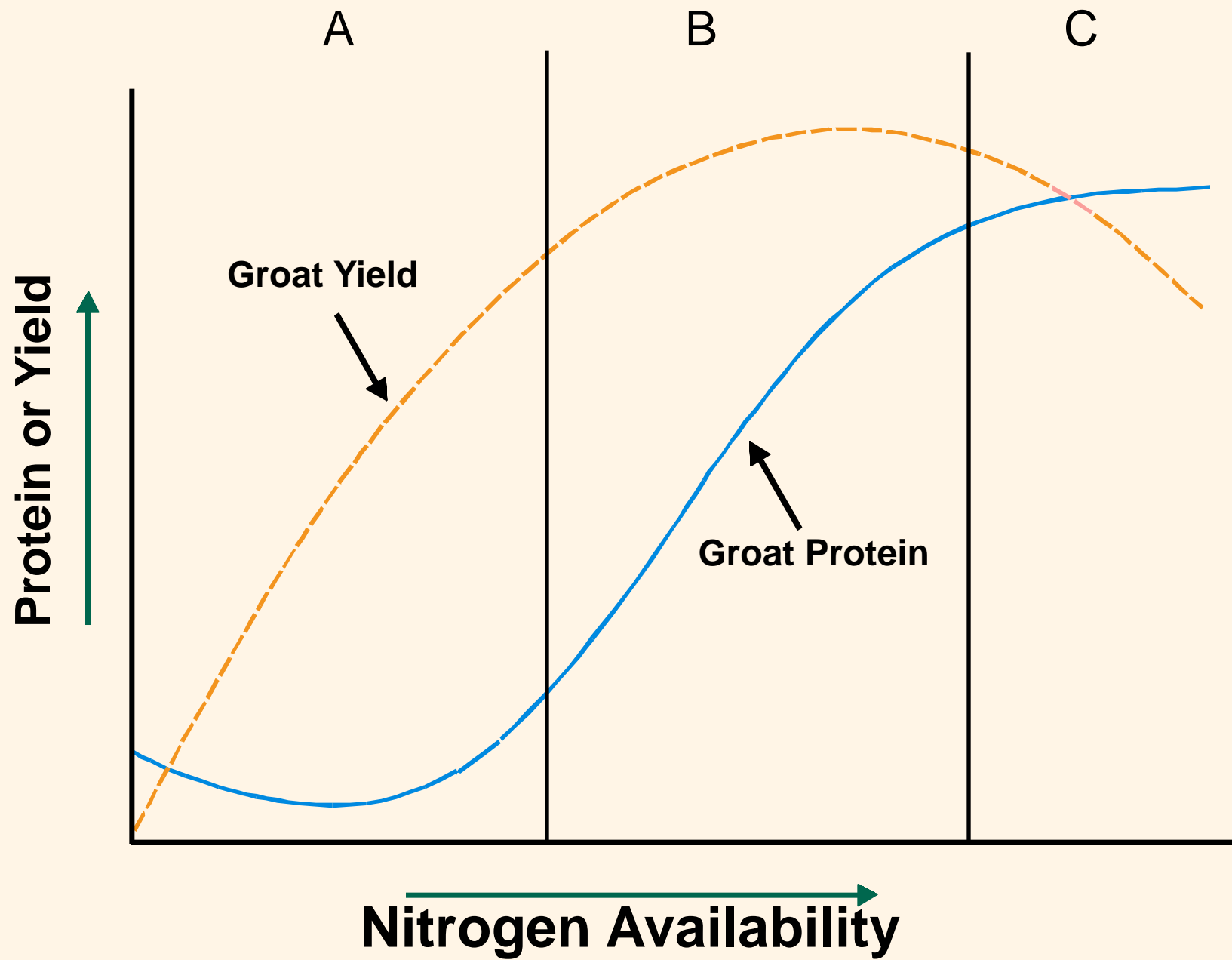
Oat

- Cultivated increasingly as a promising healthy food crop
- High protein, lysine, fibre and β -glucan
- Fibre and β -glucan coloratory health



N fertility

- Increase yield
- Increase protein
- May cause lodging
- May lead to NO_3 -leaching
- May have a positive effect on β -glucan, for registration of high-yielding lines with marginal β -glucan
- Oil and protein are often negatively associated




Objectives

- Understand the effects of location and N fertilization on the yield and quality of Quaker preferred oat cultivars.
- Identify suitable cultivar x N application rates for improving β -glucan and yield in specific locations.

Materials and Methods

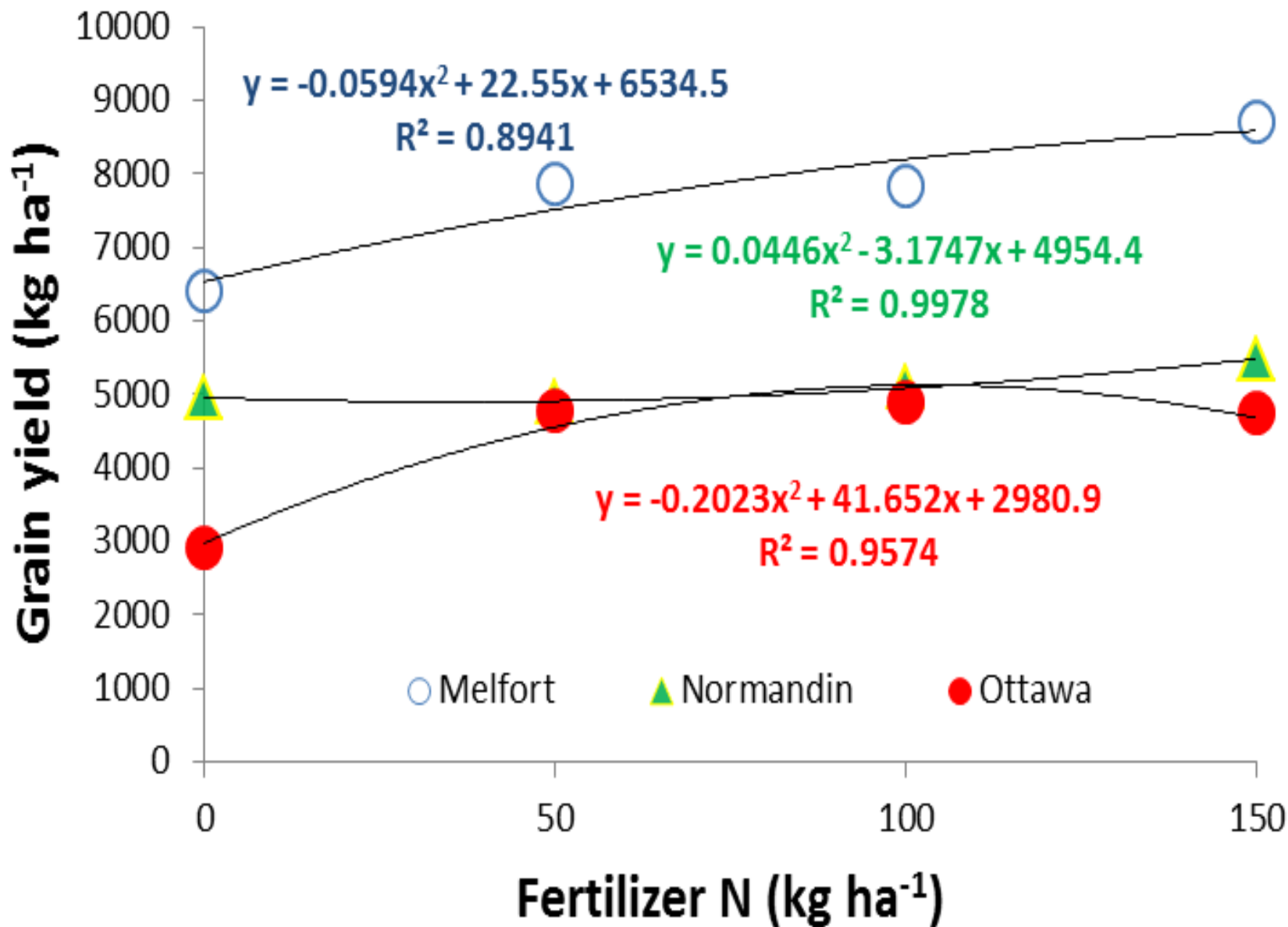
- Cultivars:
 - CDC Seabiscuit, Minstrel, Orrin, Morrison
 - Quebec: SA060123, CFA1107
 - ECORC: Bullet, Dieter, OA1331-5, OA1357-2
 - CRC Summit, Stride
- N rates: 0, 50, 100, and 150 kg N ha⁻¹
- Split-plot design with 3-4 replications

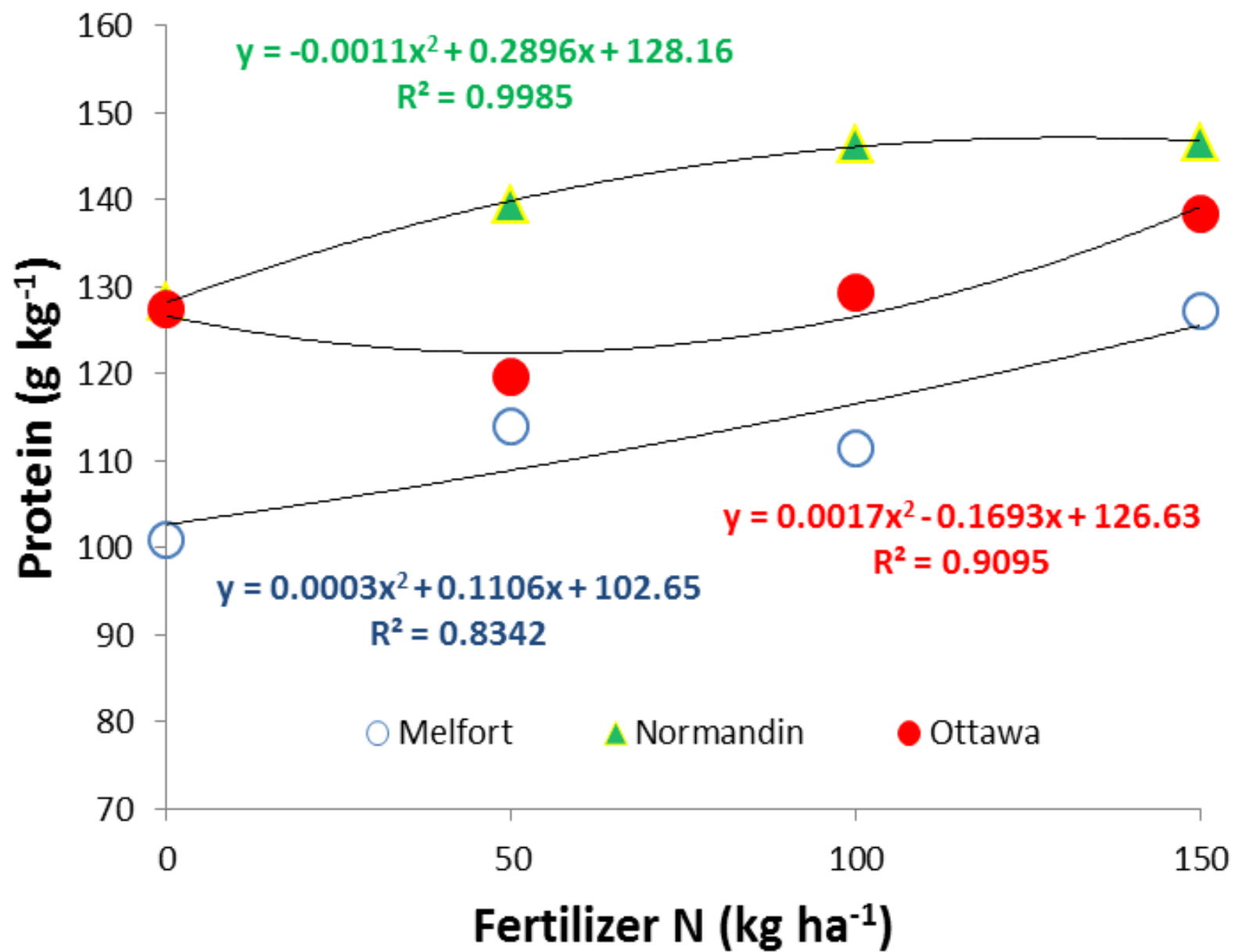
Measurements

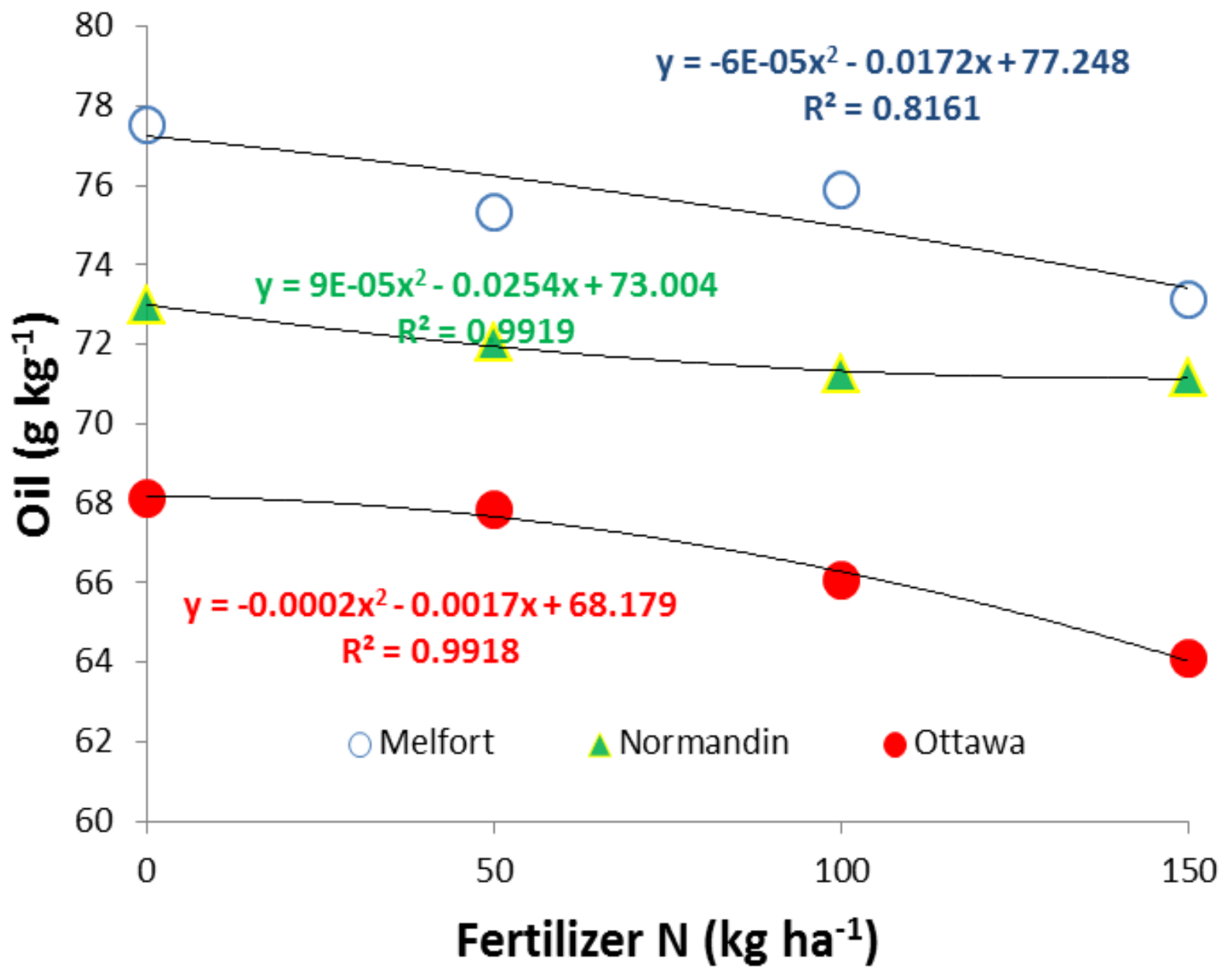
- Soil basic fertility (OM, pH, available NPK)
 - Belgian lodging score index
 - Biomass at heading
 - Yield and yield components, harvest index
 - Grain and straw N and P concentration
 - Groat yield
 - Groat protein, oil, and β -glucan concentrations
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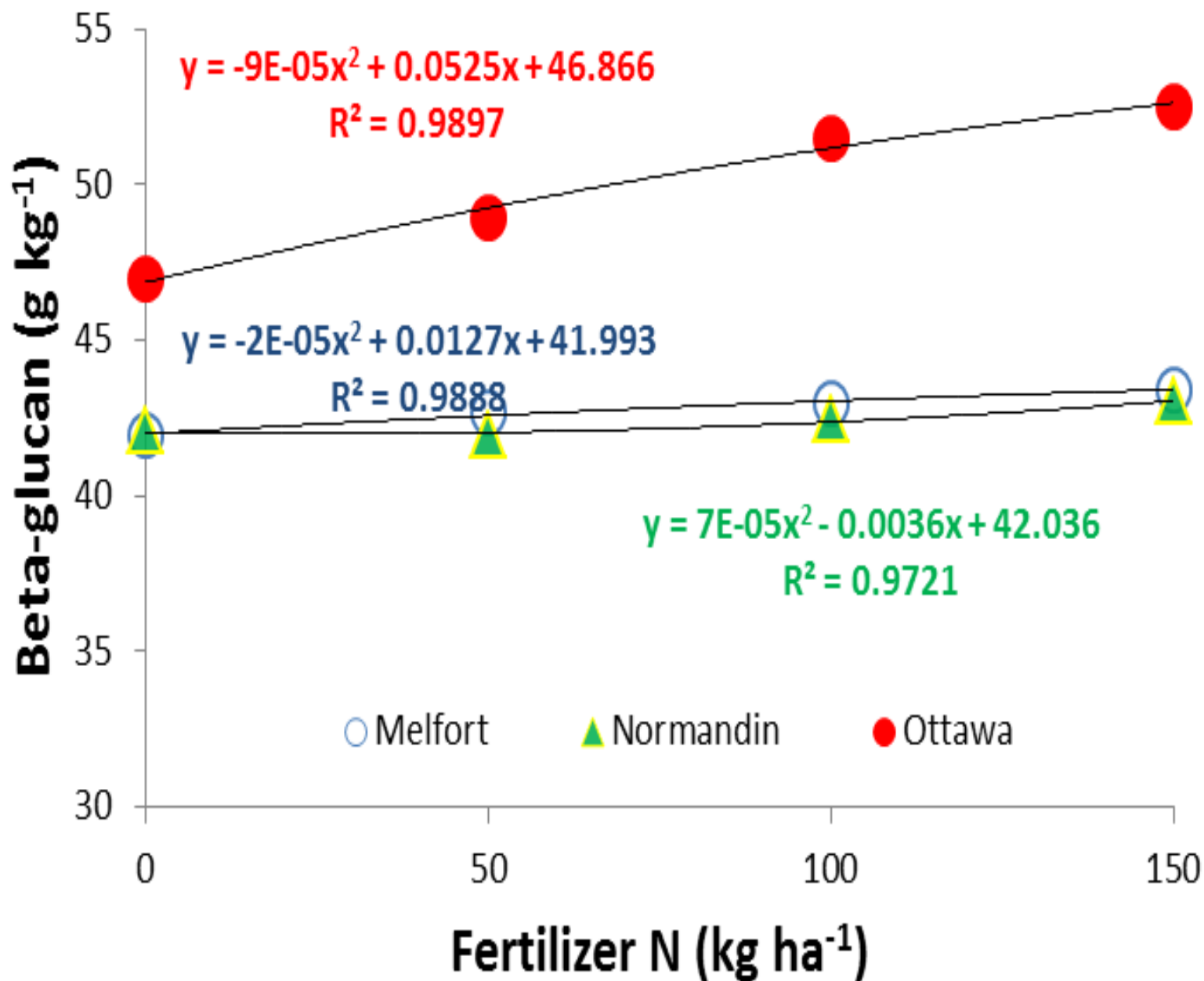
Results

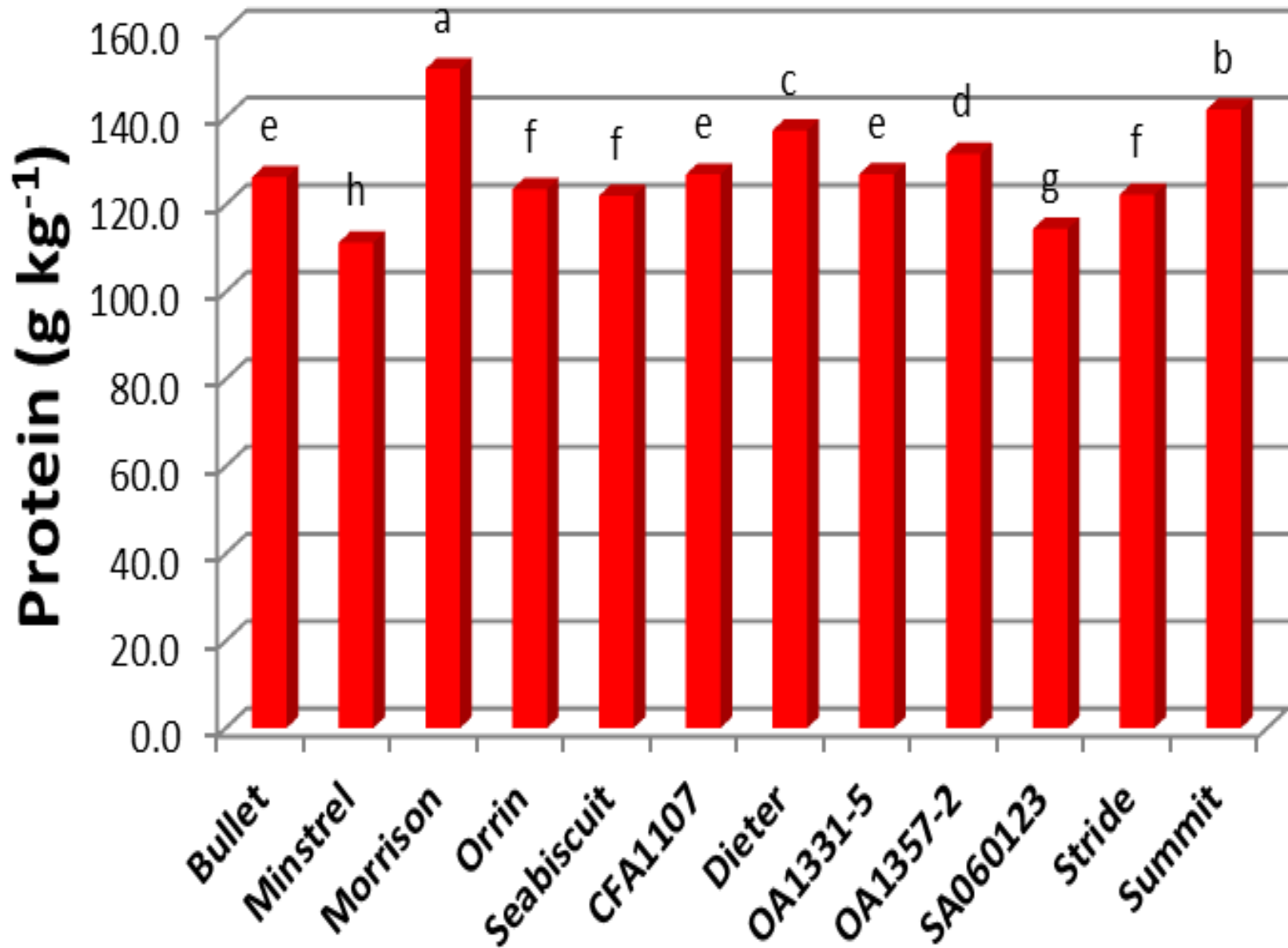


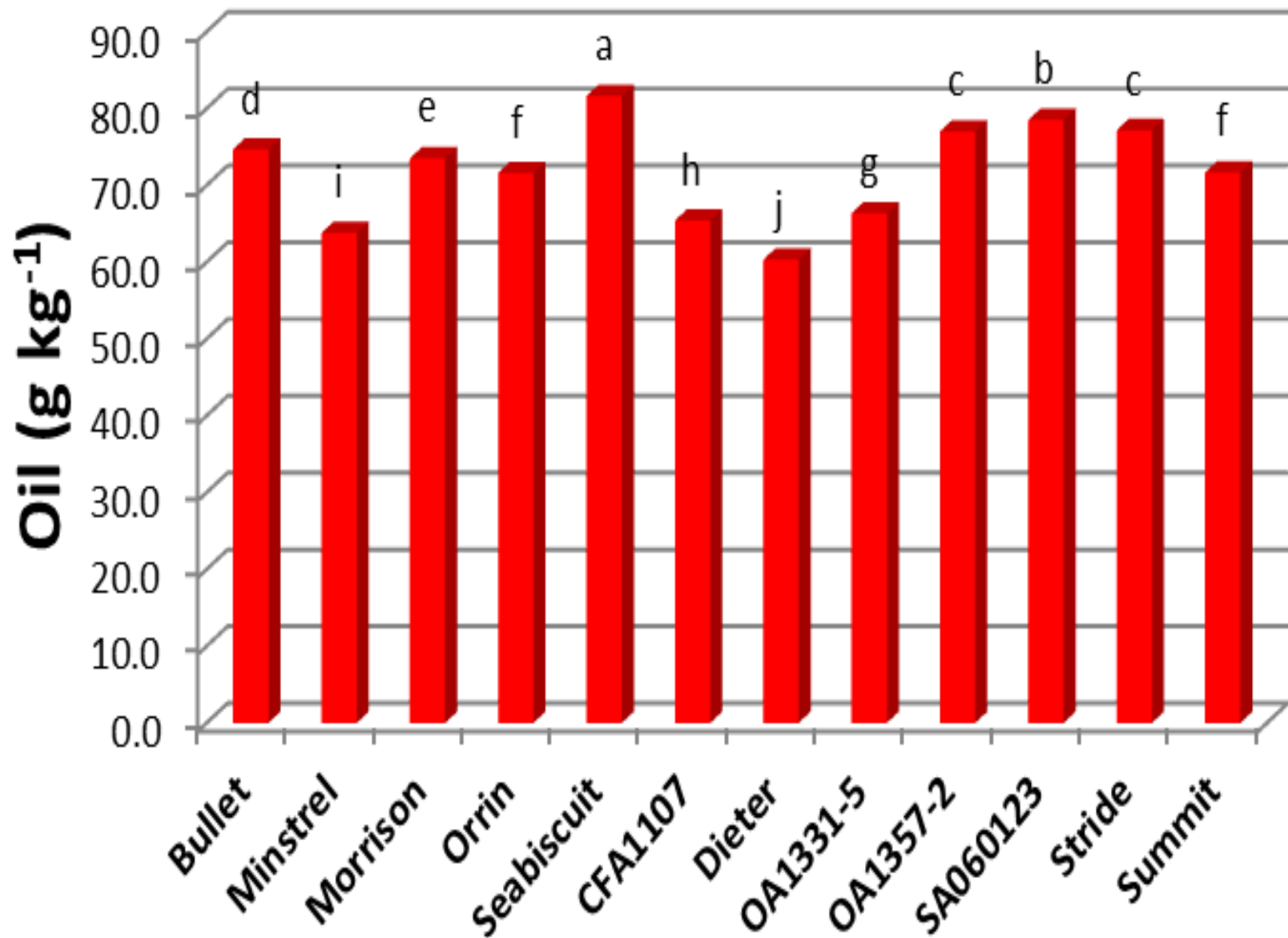


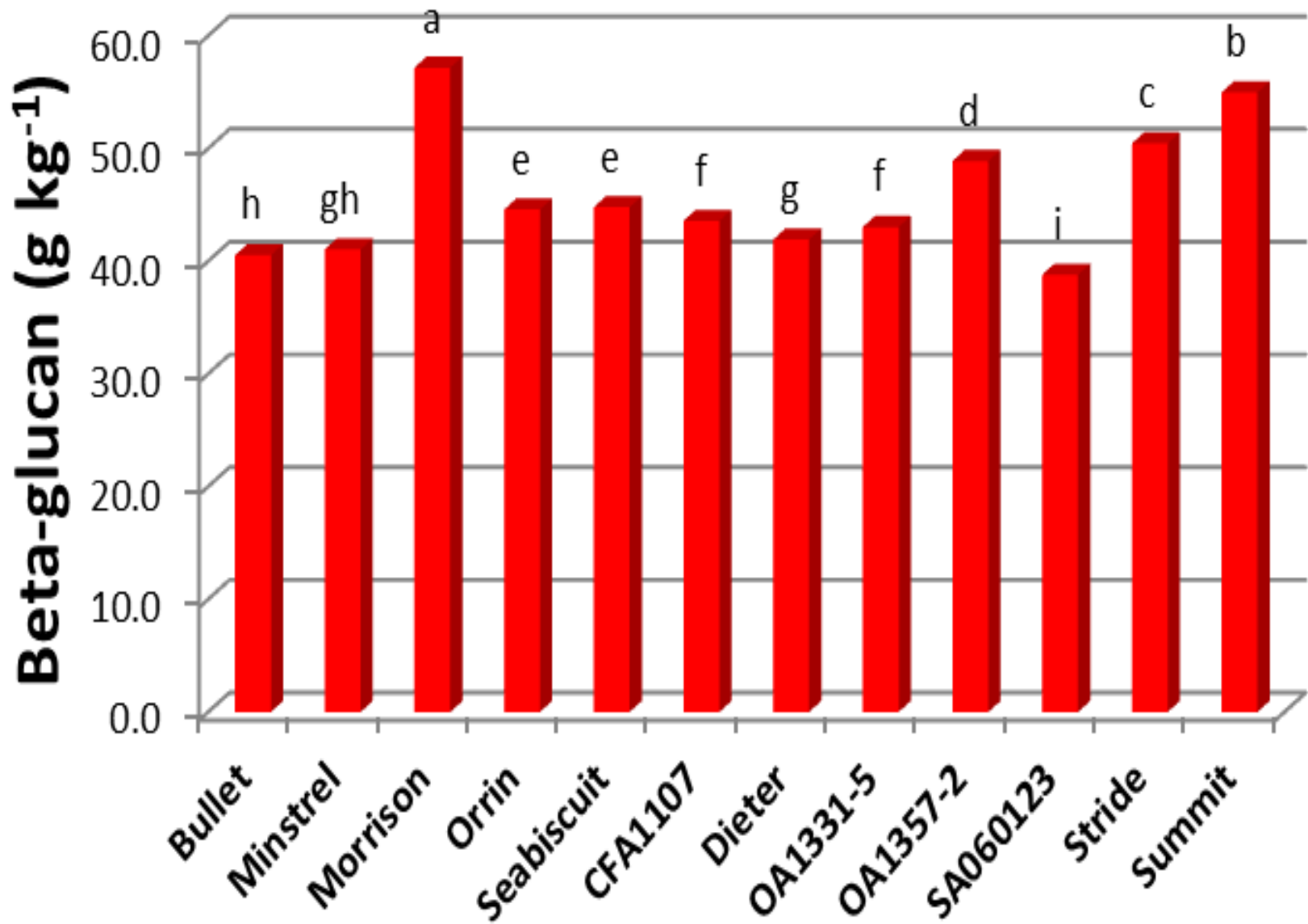


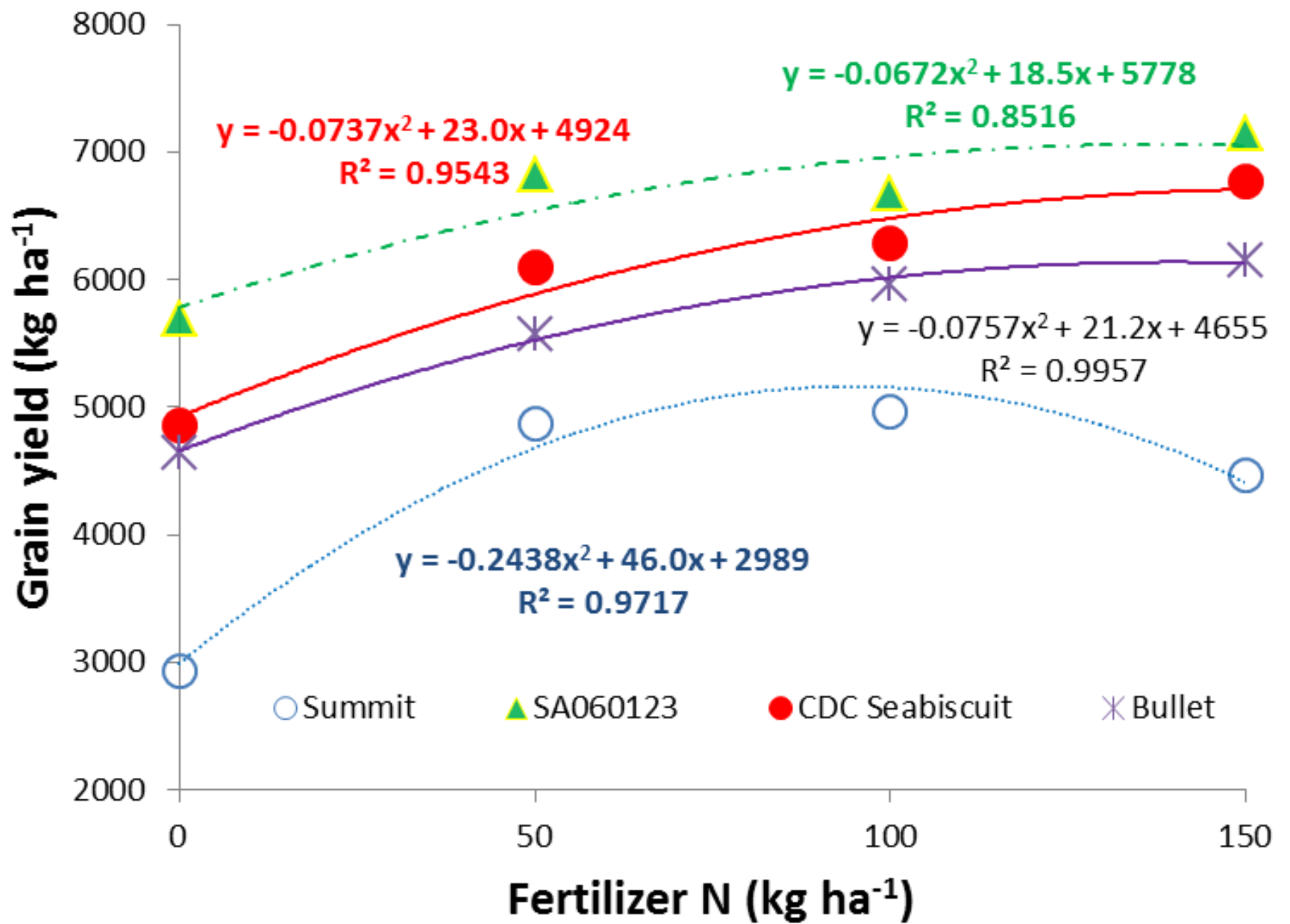












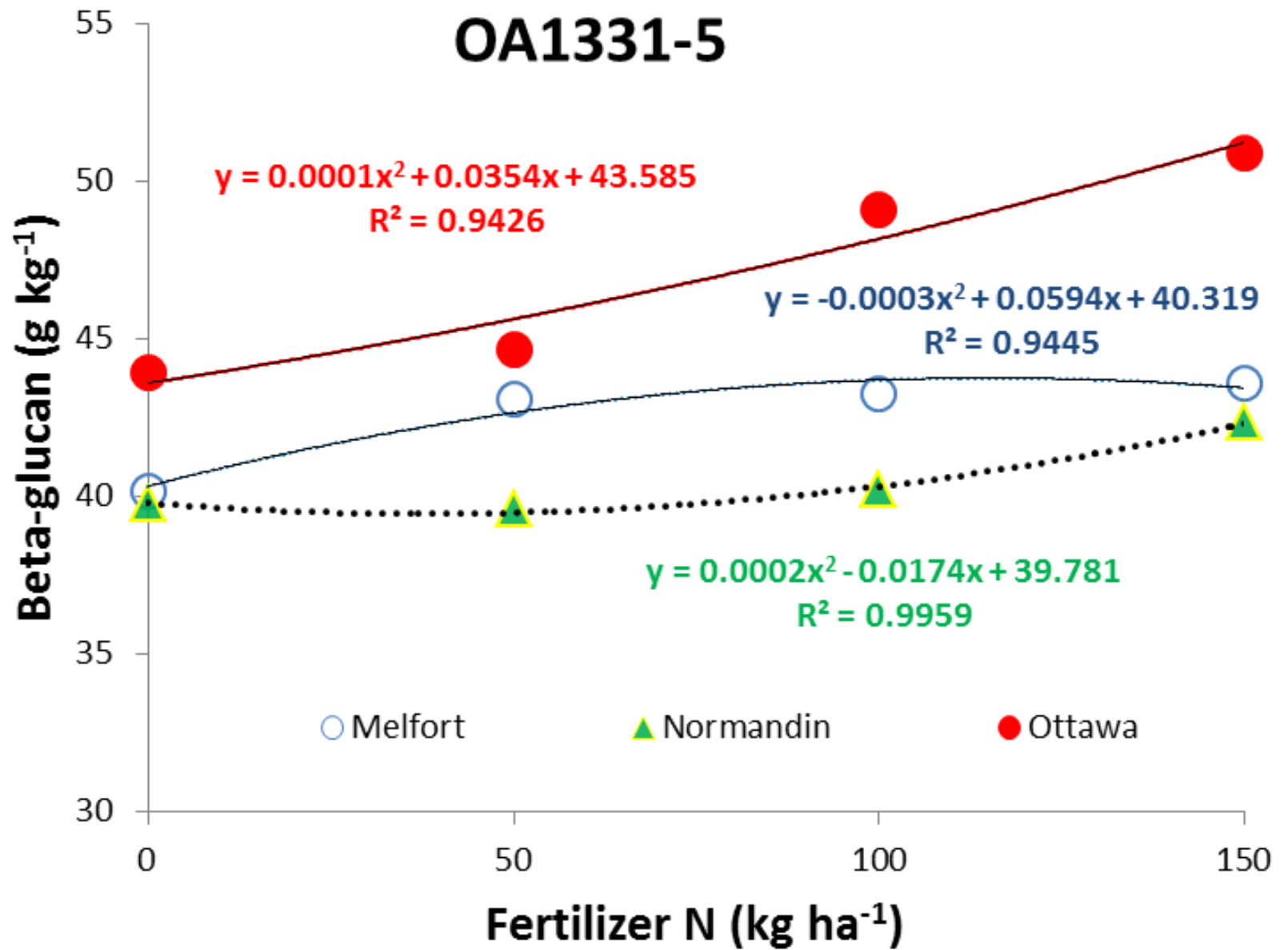
○ Summit ▲ SA060123 ● CDC Seabiscuit ✖ Bullet

Partial Correlation Analysis

	Protein	Oil	Yield
β -glucan	0.37*** 0.0001	-0.11 0.06	0.13* 0.03
Protein		-0.37*** 0.0001	0.43*** 0.0001
Oil			-0.32*** 0.0001

DF = 300

OA1331-5



Summary

- Protein, oil and β -glucan concentrations varied largely across sites and were affected by genotypes and N fertility.
- Ottawa had the highest β -glucan, Normandin the highest protein and Melfort, the highest oil concentrations.
- CDC Morrison had the highest β -glucan (5.7%), followed by Summit (5.5%), SA060123 the lowest (3.9%).

Summary (cont'd)

- CDC Seabiscuit had the highest [oil] (8.2%), Dieter had the lowest (6.0%).
- CDC Morrison had the highest protein (15.1%), followed by Summit (14.2%). CDC Minstrel ranked the last for protein (11.1%).
- β -glucan was positively correlated with protein concentration ($P < 0.01$) and with grain yield ($P < 0.05$), and negatively correlated with oil concentration ($P < 0.07$).

Summary (cont'd)

- Increasing N application increased protein and β -glucan concentrations, but decreased the oil concentration.
- Significant 2- or 3-way interactions on oil ($P < 0.01$), protein ($P < 0.05$), and also on β -glucan concentrations ($P < 0.05$). Caution must be taken with interpretation of the results.

Thank you!



Any questions?