Do components of barley variety mixtures converge for malting quality attributes ?

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Introduction

- Mixture components may have complementary, compensatory or competitive effects upon each other
- Phenotypic expression has genotypic and environmental components
- Growing within mixtures may affect environmental aspect and can lead to convergence for physical traits such as height
- This work was aimed at determining whether similar effects can be observed on quality traits

Trial set-up

Varieties: Chalice (European 2-row, short straw), Harrington (Canadian 2-row) Morex (US 6-row) - phenotypically distinct for ease of identification

Plots: **Monocultures** and equal component mixtures (either **Random** seed distribution or in **Alternate Rows**)

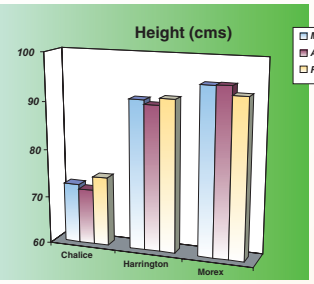
Reps: 2 (Fungicide treated) **Harvest:** by hand to retain plant identity

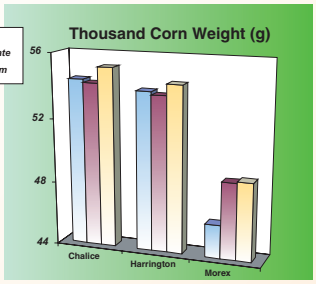
Physical dimensions

Morex shorter in random mixture with heavier grain in both mixtures

Morex had narrower grain than the other cultivars in monoculture

Chalice and Morex both showed significantly greater grain width in mixtures compared to monoculture





Mean grain width (mm)

Variety	Grown in : Mono.	Alt. Rows	Random Mix.
Chalice	**4.03c**	**4.08d**	**4.08d**
Harrington	**4.08d**	**4.05cd**	**4.08d**
Morex	**3.86a**	**3.96b**	**3.96b**

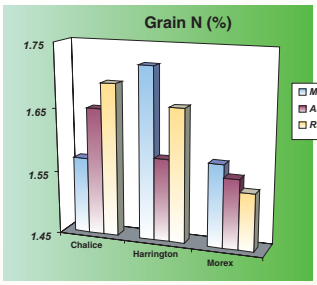
Means differences (different letters) significant at 1% level

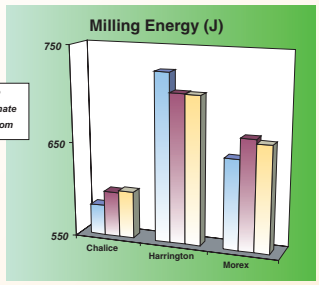
Grain Quality & Germination

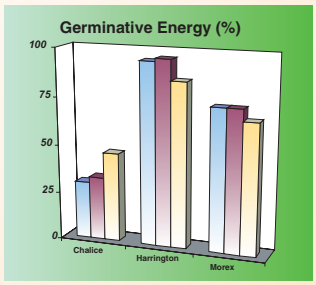
Chalice had higher N and higher milling energy (ME) in mixtures

Harrington had lower N in mixtures, but ME differences were not significant

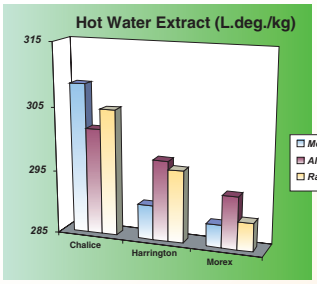
Harrington had slightly lower and Chalice slightly higher Germinative Energy, 2 weeks after harvest in random mixtures

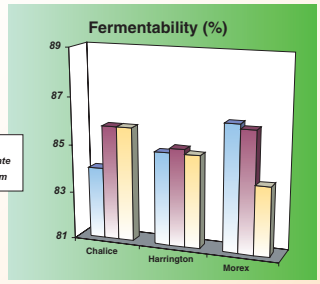






Malt analyses





Conclusions

- Harrington and Morex give better extracts in alternate row mixtures compared to monoculture - Harrington also better in random mixture
- Likely to reflect lower N in Harrington and better grain fill in Morex
- Chalice shows slightly lower extract in mixtures, but higher fermentability, so alcohol yield will be similar
- Barley varieties may thus give different malting performance in mixtures - some evidence of convergence
- Future research will consider whether similar effects are observed in more phenotypically similar varieties

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