



Patterns of $G \times E$ in Perennial Forage Grasses

J.G. Robins, B. Biligetu, A. Claessens, N. Khanal, S.R. Asselin, & M.P. Schellenberg

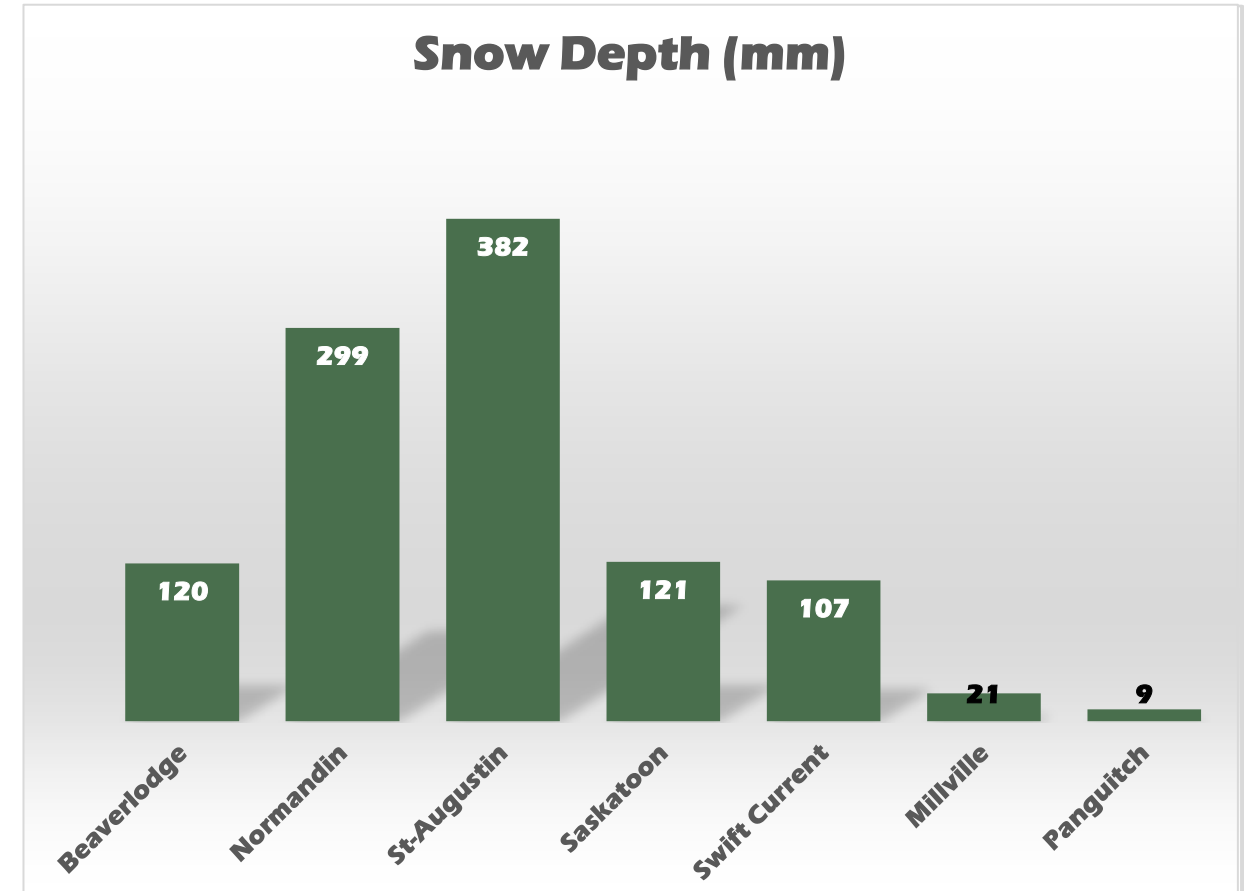




Plant Materials

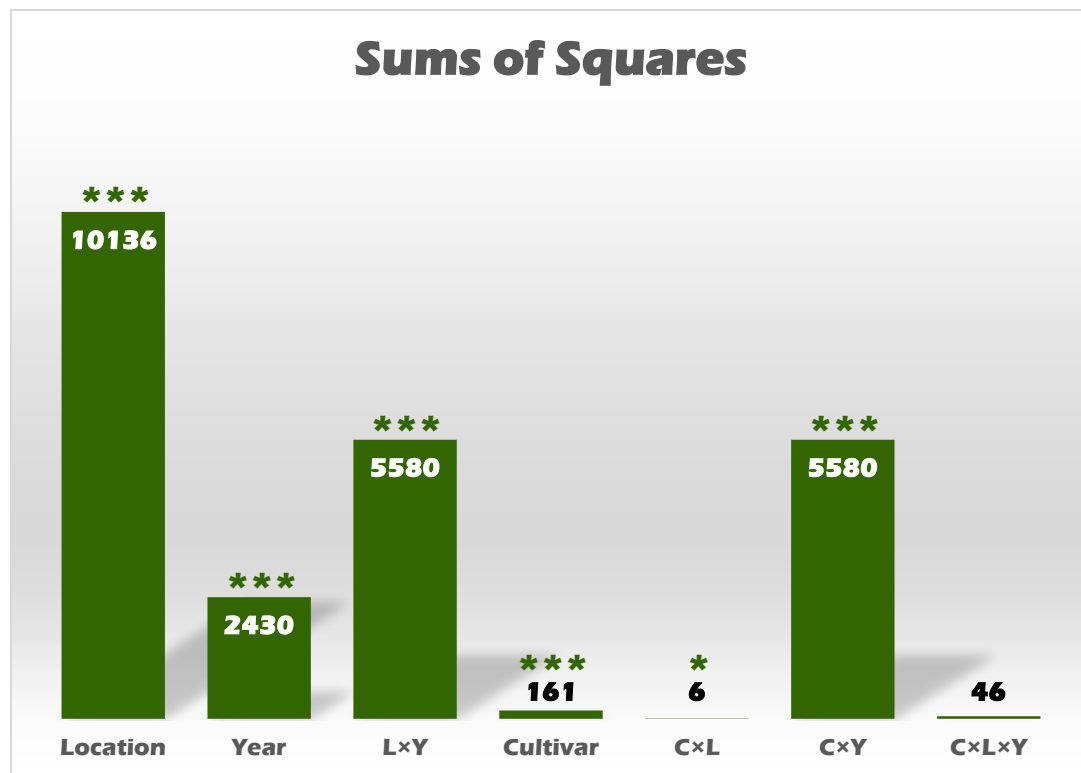
Entity	Meadow brome	Orchardgrass	Tall fescue	Timothy
AAFC	QBP-1201 QBP-1301			QF-0901 QF-1701 QF-1702
USask	S-9498	S-9485 SFD-200102 SFD-9601	S-9582	S-9530
USDA	UTMB-B UTMB-S	UTDG-101 USDA UTWH-102		UTTM1601 UTTM1602
Check Cultivars	Armada (SK) CDC Torsion (SK) Paddock (SK) Cache (UT)	AC Killarney (SK) AC Early Arctic (SK) Latar (WA) Okay (ON)	Arido (WA) Courtenay (BC) Cowgirl (OR) Fawn (OR) Kokanee (SK) Tower (CANADA)	AC Alliance (QC) Aurora (JAPAN) CDC Tiznow (SK) Climax (ON)



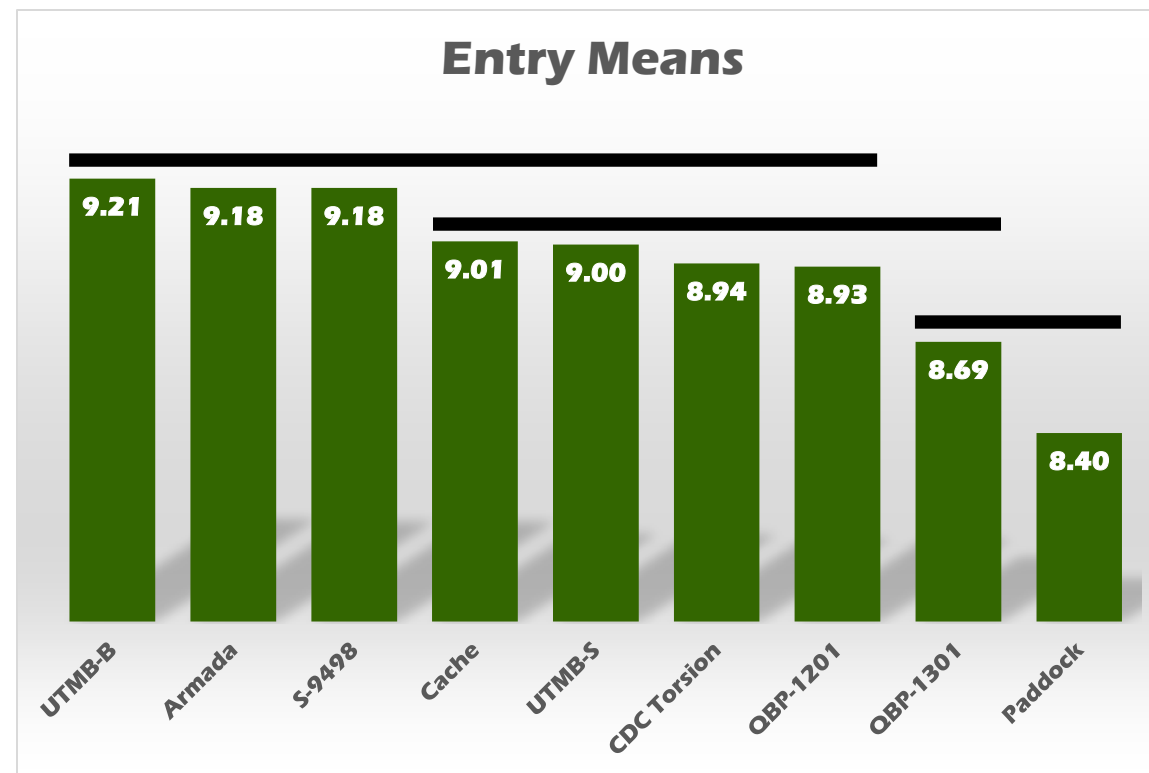


Meadow bromegrass

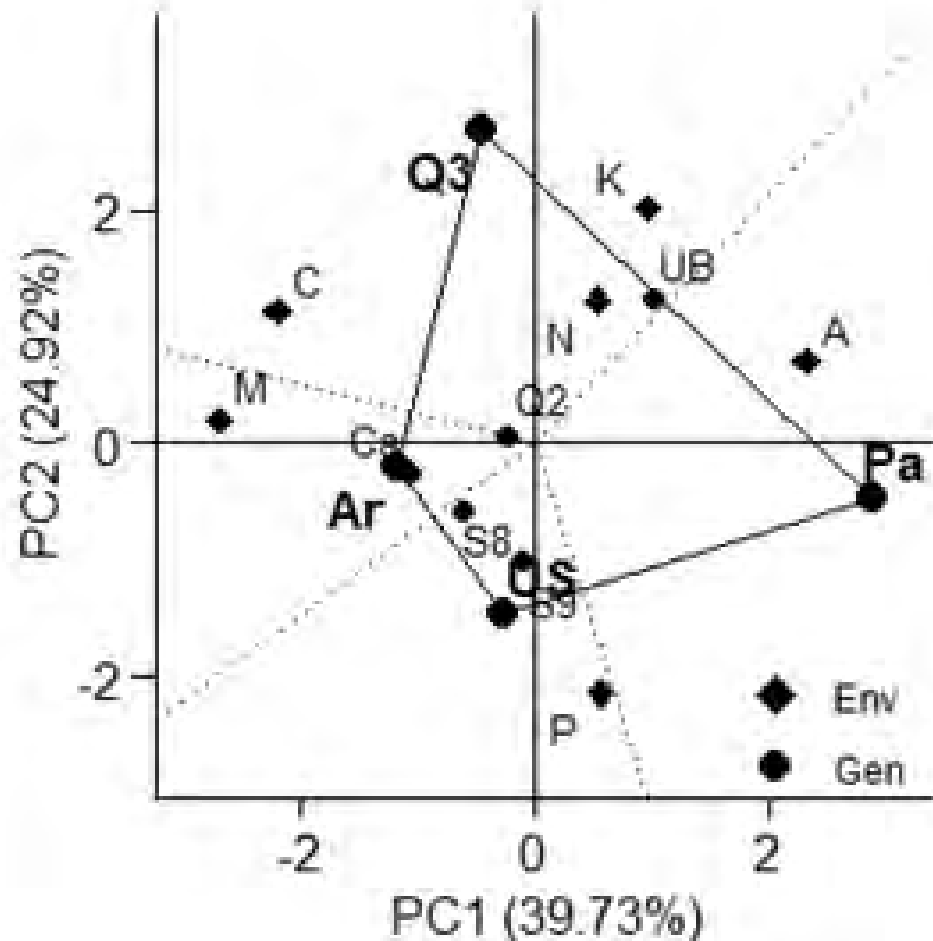
Sums of Squares



Entry Means



Meadow bromegrass



Normandin, Saskatoon, Swift Current
- **QBP-1201, QBP-1301, UTMB-B**

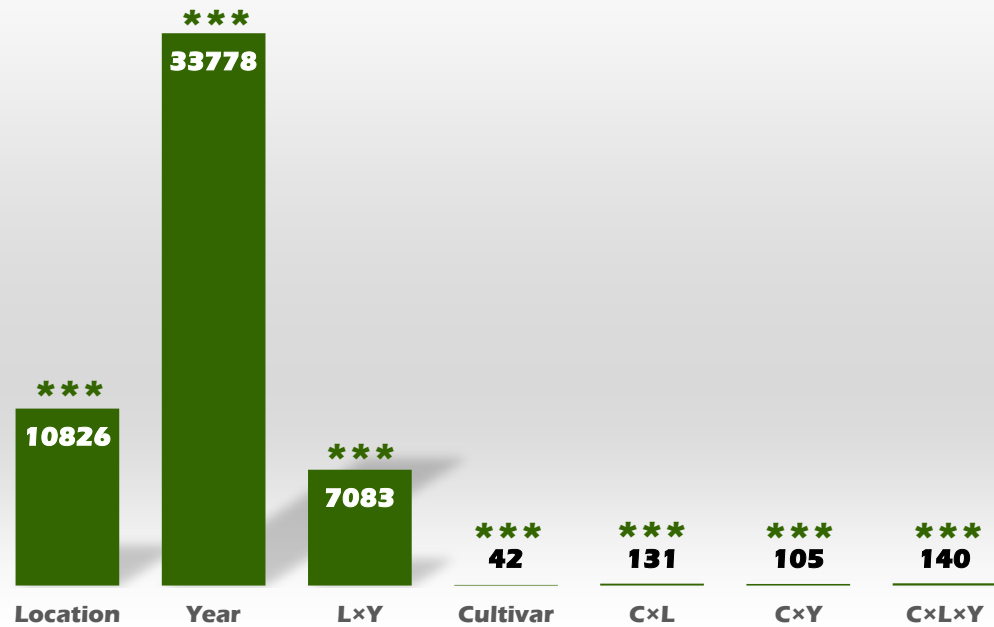
St-Augustin
- **Paddock**

Panguitch
- **CDC Torsion, S-9498, UTMB-S**

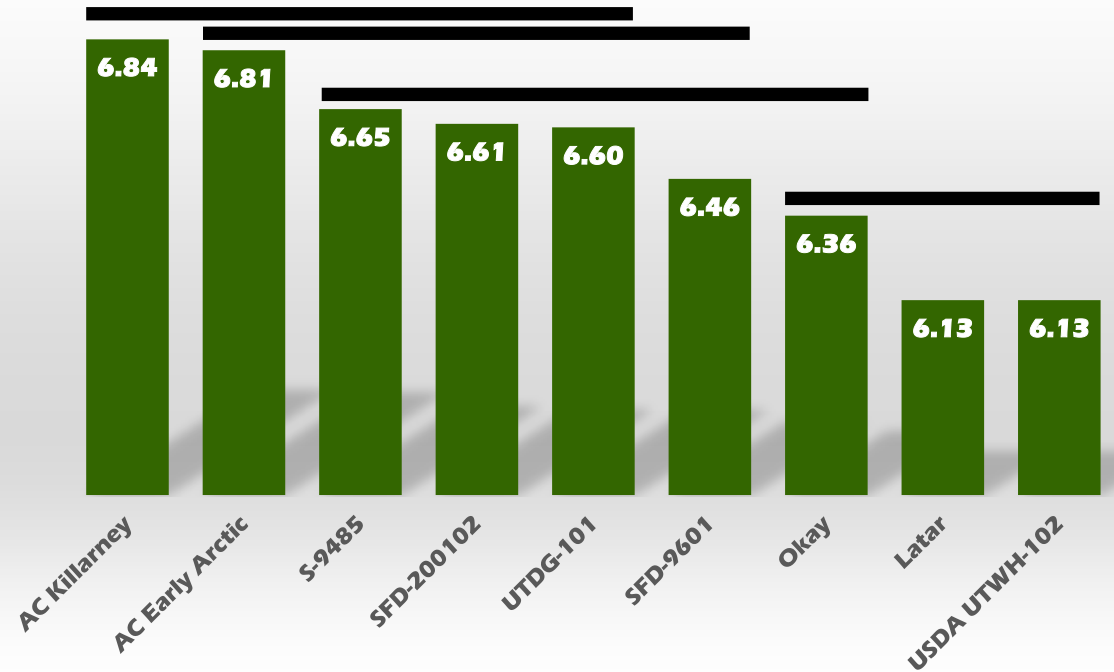
Millville
- **Armada, Cache**

Orchardgrass

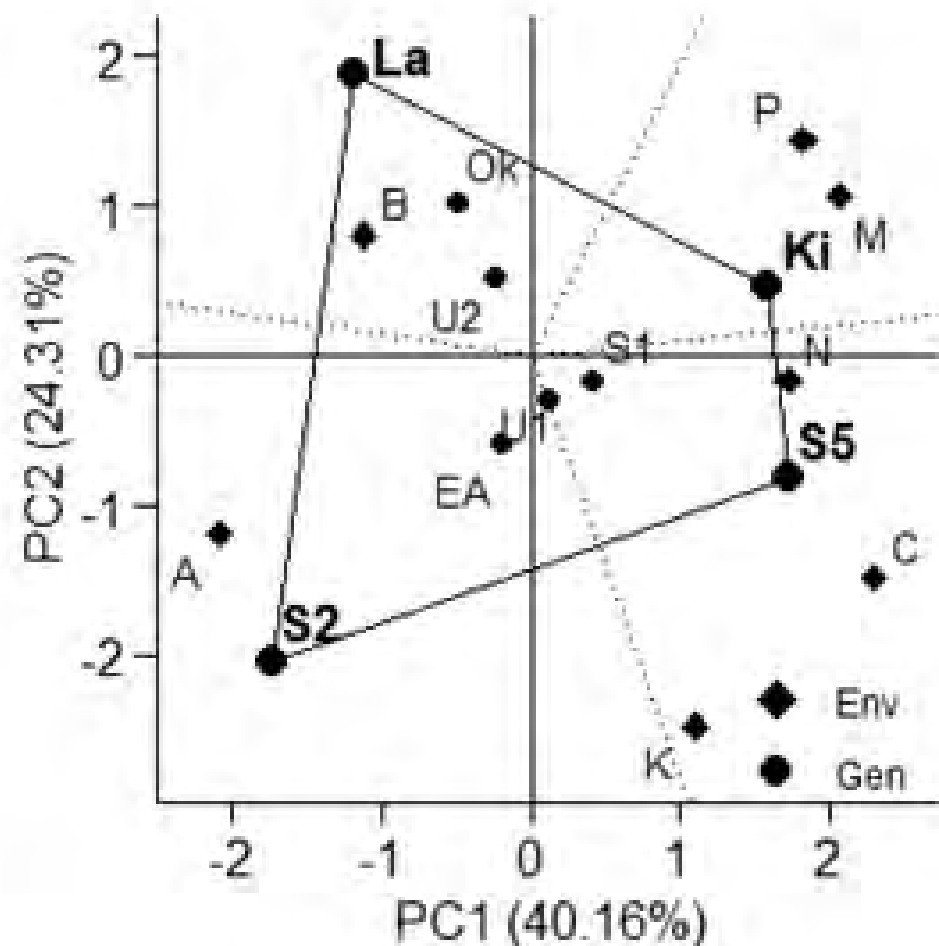
Sums of Squares



Entry Means



Orchardgrass



Beaverlodge

- Latar, Okay, USDA UTWH-102

Millville, Panguitch

- AC Killarney

Normandin, Saskatoon, Swift Current

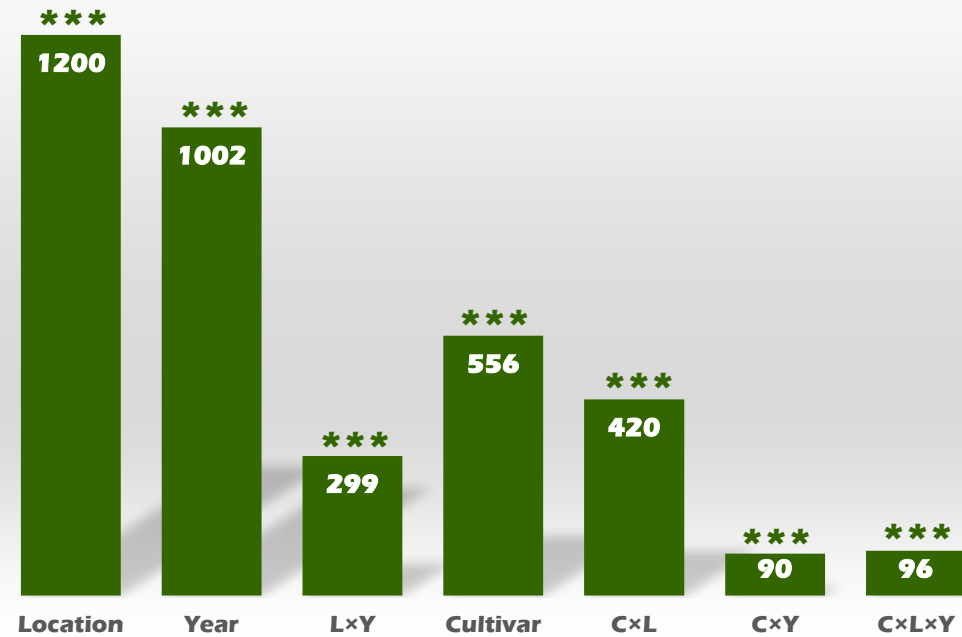
- S-9485, SFD-9601, UTDG-101

St-Augustin

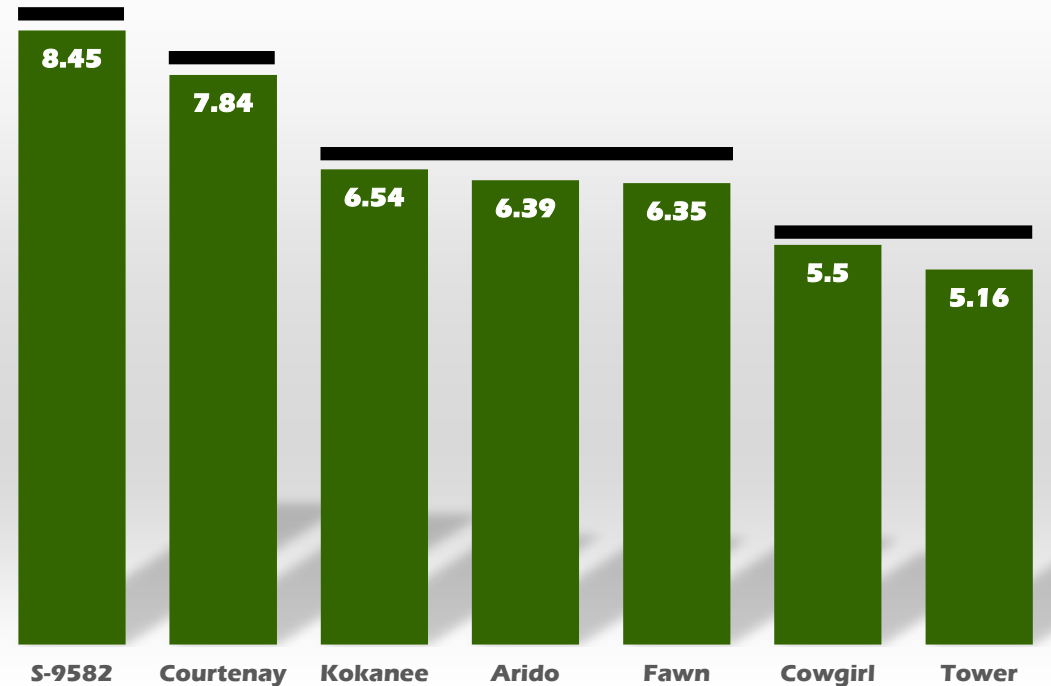
- AC Early Arctic, SFD-200102

Tall fescue

Sums of Squares

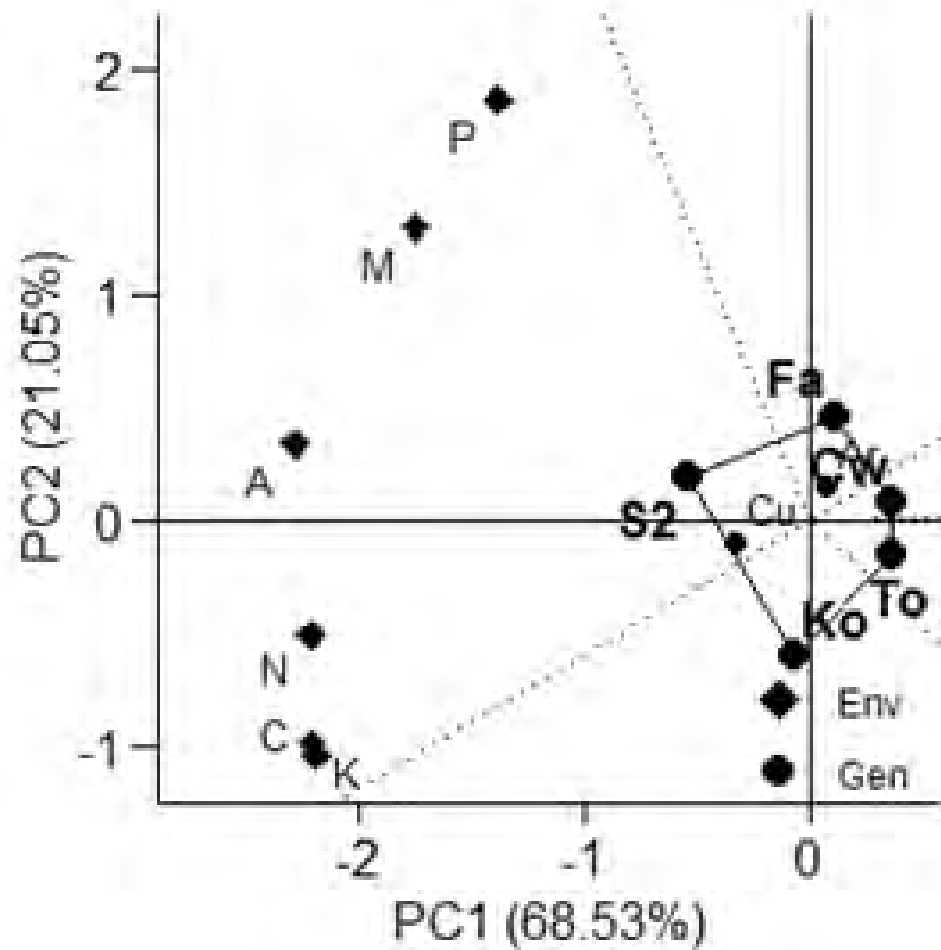


Entry Means



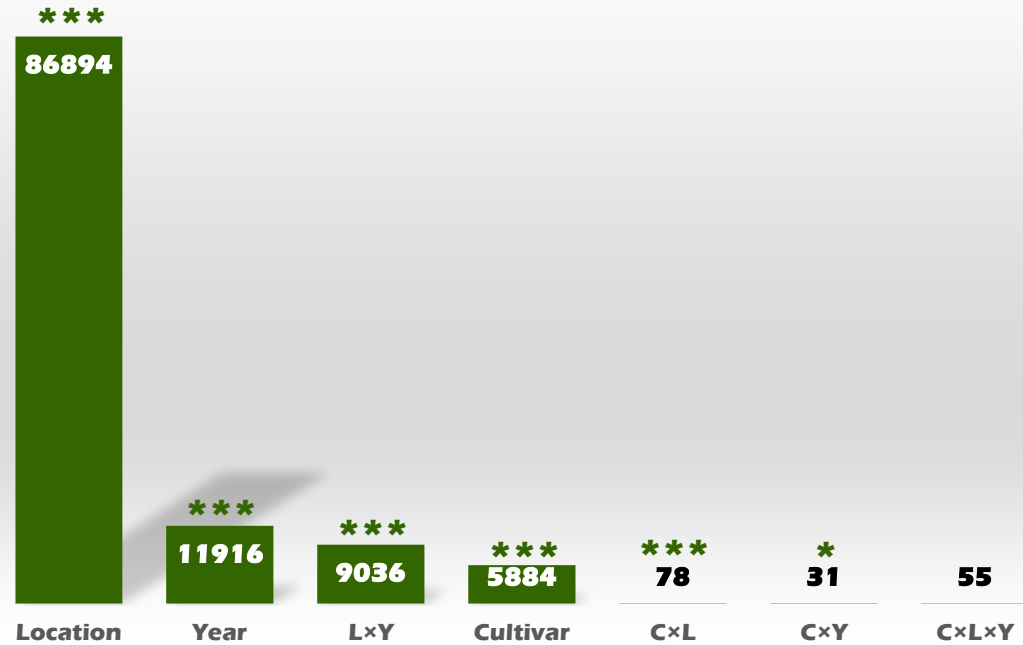
Tall fescue

**Millville, Normandin, Panguitch,
Saskatoon, St-Augustin, Swift Current
- Courtenay, S-9582**

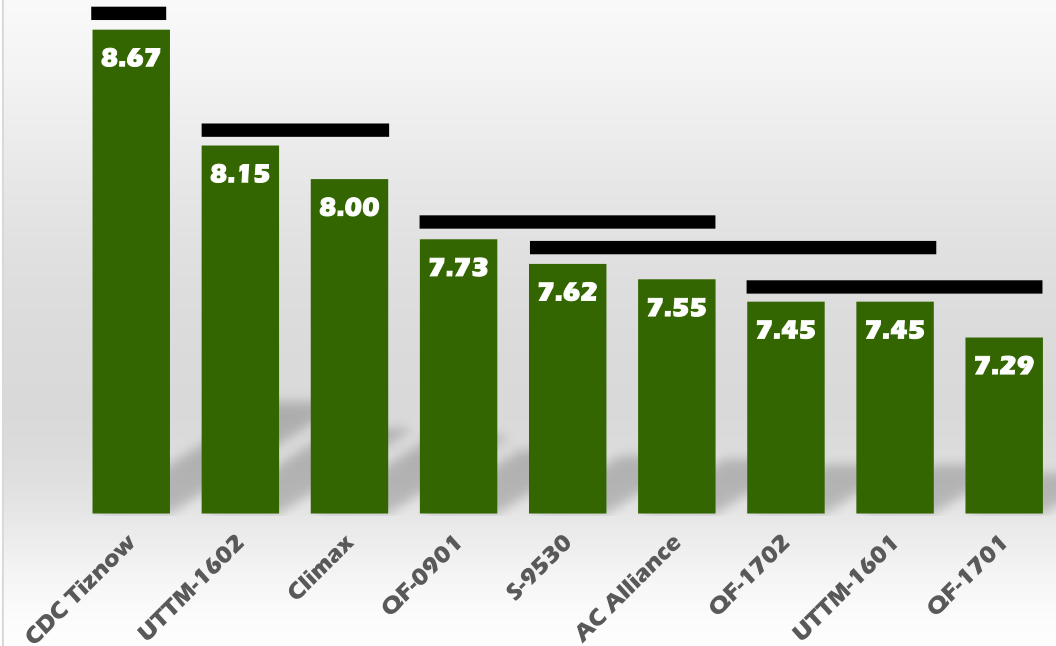


Timothy

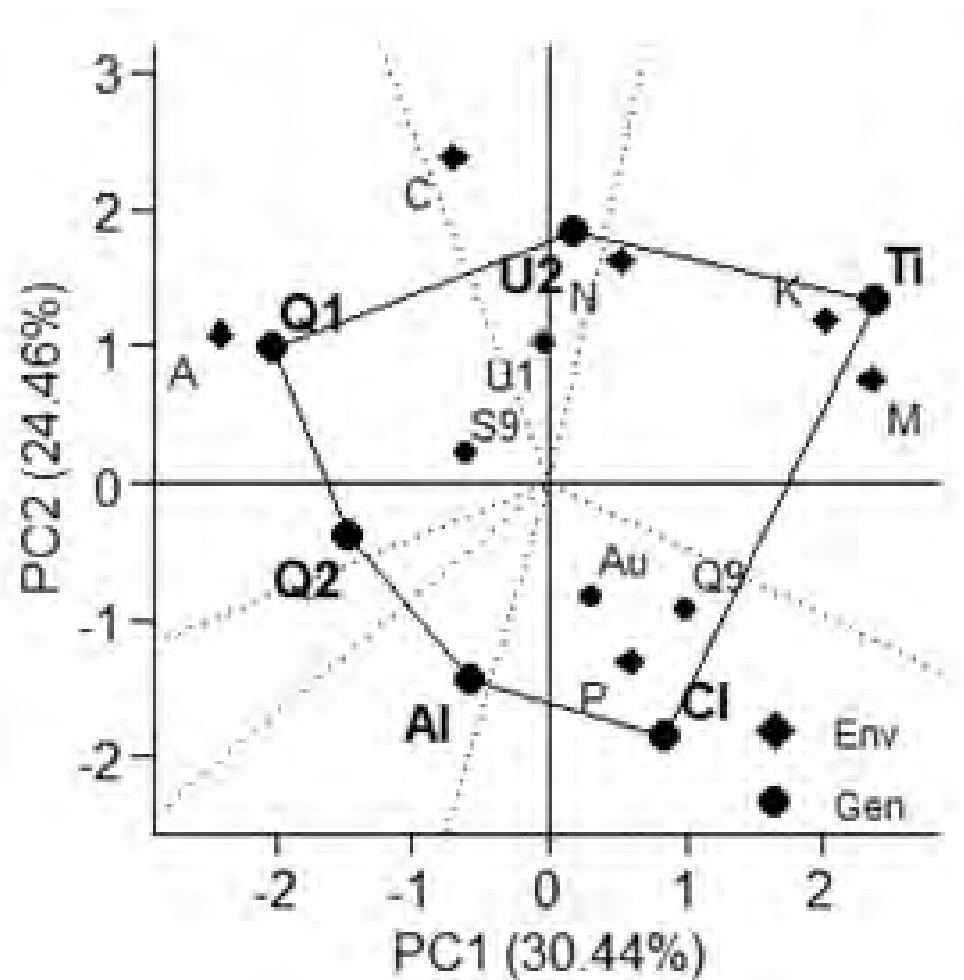
Sums of Squares



Entry Means



Timothy



Swift Current

- **UTTM-1601, UTTM-1602**

Millville, Normandin, Saskatoon

- **CDC Tiznow**

Panguitch

- **Aurora, Climax, QF-0901**

St-Augustin

- **QF-1701, QF-1702, S-9530**

None

- **AC Alliance**

Conclusions

Locations

- **Except for TF, little evidence of broad adaptation**
- **Some locations tend to group together**
 - **Normandin, Saskatoon, Swift Current**
- **Correlations between FY and mean temperature, low temperature, and growing degree days**
- **Need for ongoing region-specific breeding programs**



1

1 **Genotype × environment interaction patterns of dry matter yield in meadow**
2 **brome, orchardgrass, tall fescue, and timothy evaluated at harsh winter sites**

3

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14 **Abstract**

15 **Background:** Genotype × environment interaction (GEI) slows genetic gains and complicates
16 selection decisions in plant breeding programs. Forage breeding program seed sales often
17 encompass large geographic regions to which the cultivars may not be adapted. An understanding
18 of the extent of GEI in perennial, cool-season forage grasses will facilitate improved selection
19 decisions and end-use in areas with harsh winters.

20 **Methods:** We evaluated the dry matter yield of nine meadow brome (*Bromus biebersteinii* Roemer
21 & J. A. Schultes), nine orchardgrass (*Dactylis glomerata* L.), seven tall fescue (*Lolium*