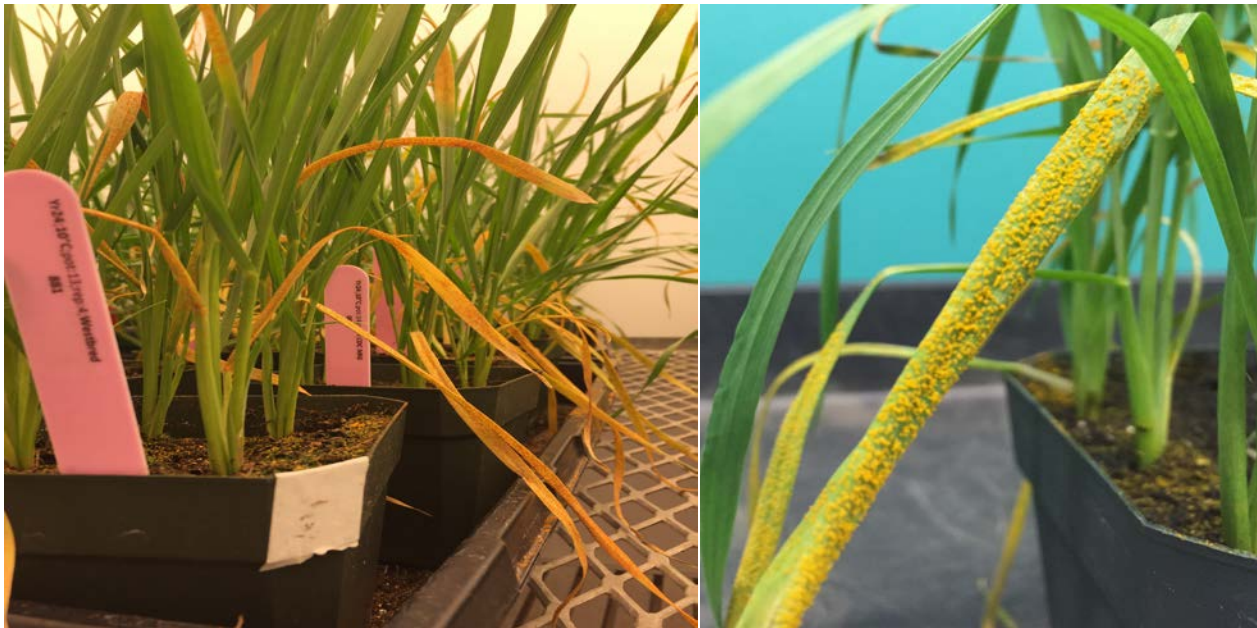


Temperature adaption of *Puccinia striiformis* f. sp. *tritici*, cause of stripe rust of wheat



V.A. Tran and H.R. Kutcher



Stripe rust of wheat

- Causal agent: *Puccinia striiformis* f. sp. *tritici* (*Pst*)
- Rust pustules develop in stripes on leaves, stems or heads
- **Polycyclic disease**
- Significant yield losses under conducive conditions



Cereal and Flax Pathology

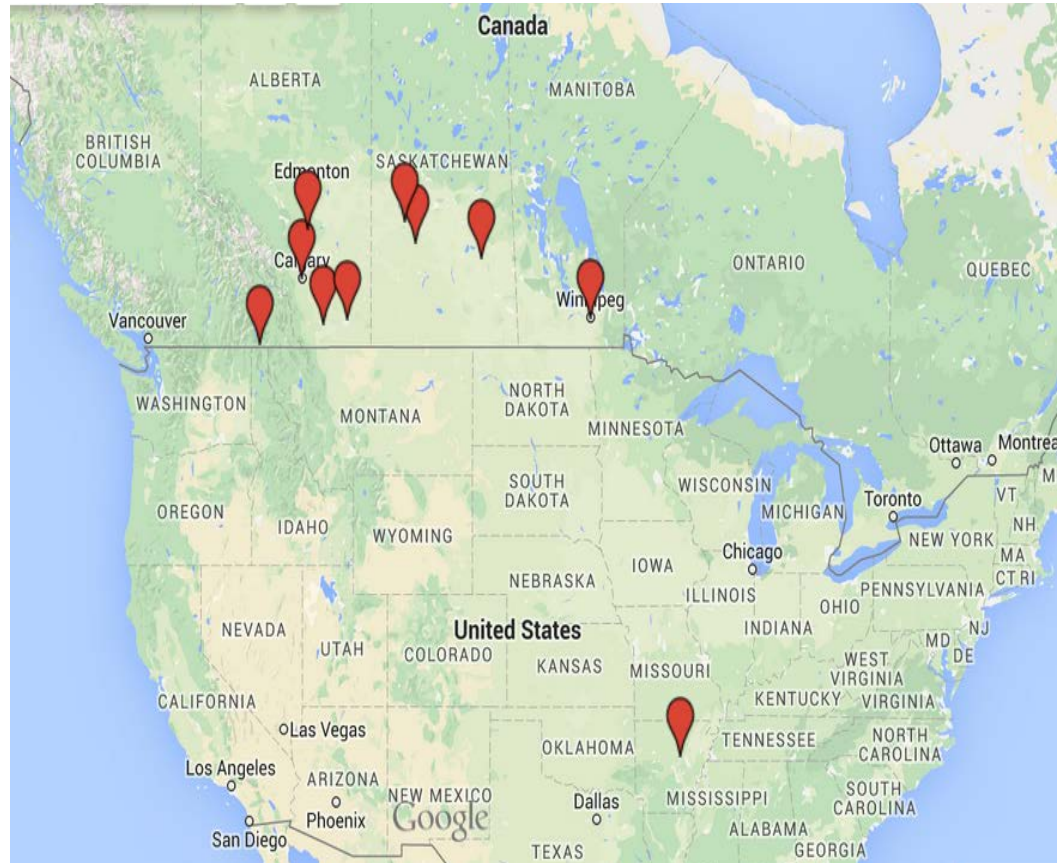
Stripe rust of wheat

- Likes cool temperature, high humidity
- Usually a problem in southern Alberta, epidemics in 1990s, 2005
- Not regularly found in SK and MB until 2000s, epidemics in 2006 and 2011
- Since 2000s stripe rust has adapted to warm temperature, south-central USA

Objective of this study

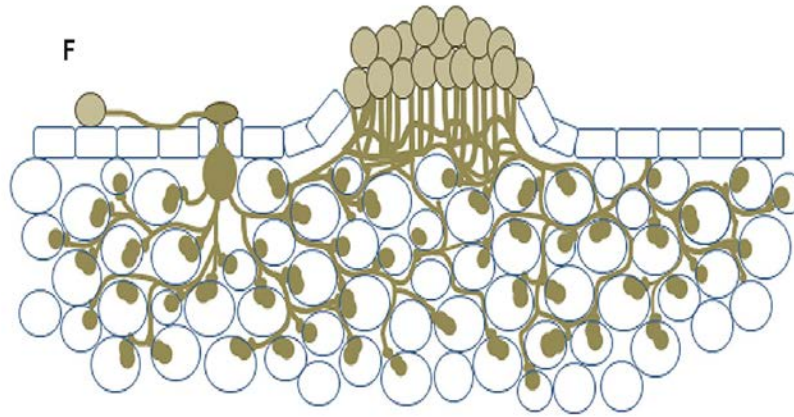
To determine if new isolates (post-2000) were better adapted than old isolates (pre-2000) to warmer temperature

Nine new and four old isolates used in this study



Three response variables

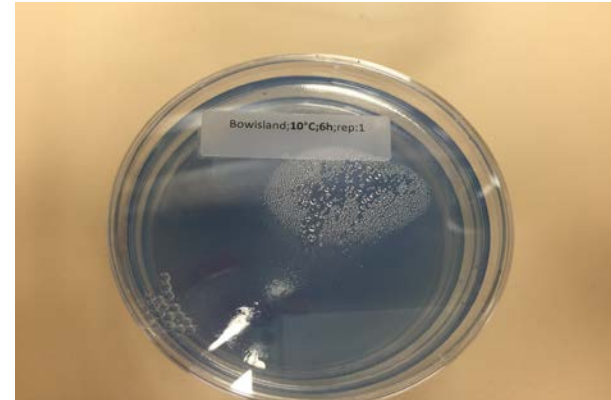
- Germination capacity
- Latent period: days from inoculation to sporulation



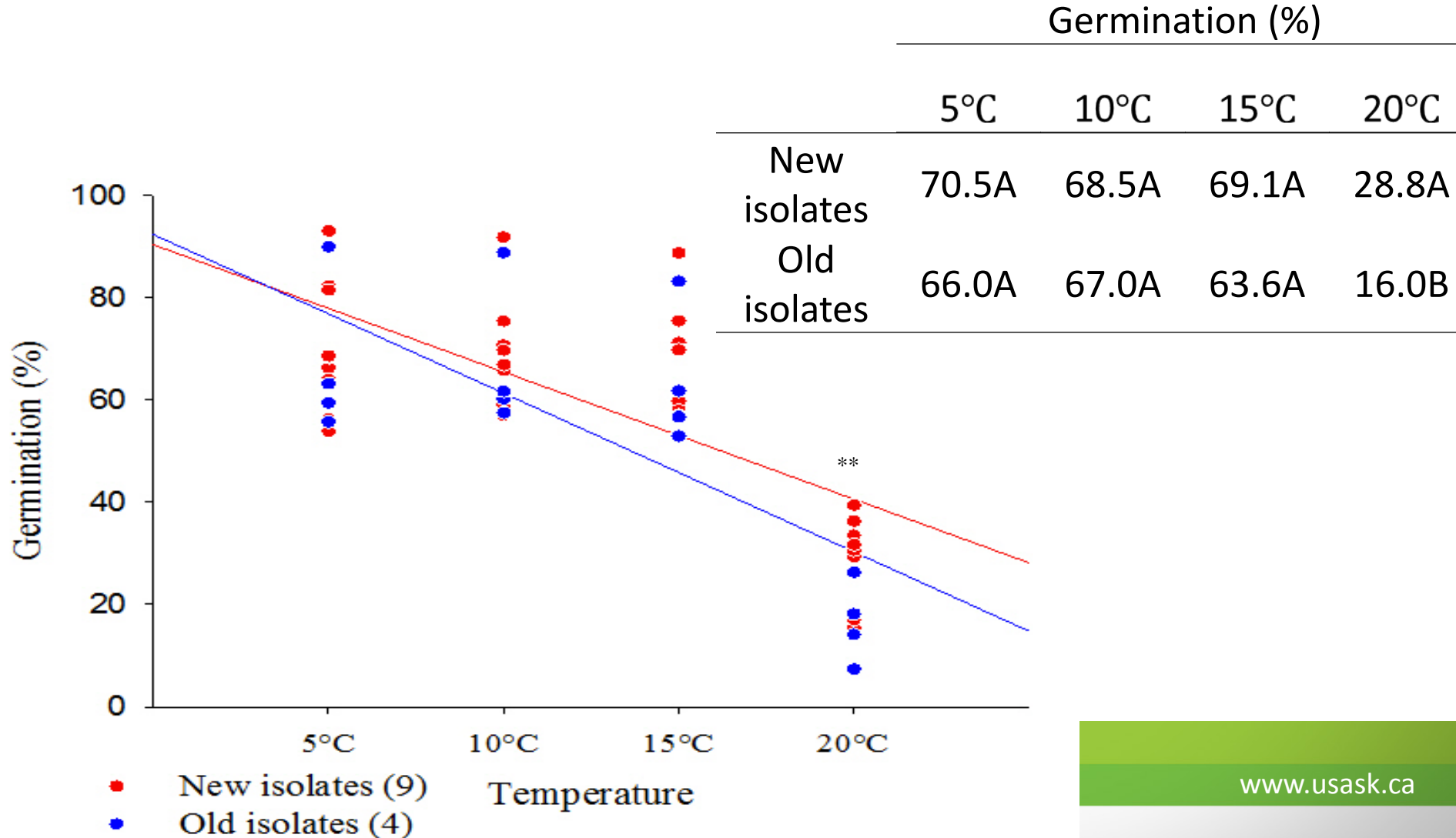
- Area under disease progress curve: disease intensity over time

In vitro germination test

- At 5, 10, 15, and 20°C
- RCBD, 3 replicates



Germination rate of new and old *Pst* isolates



Latent period and area under disease progress curve (AUDPC)

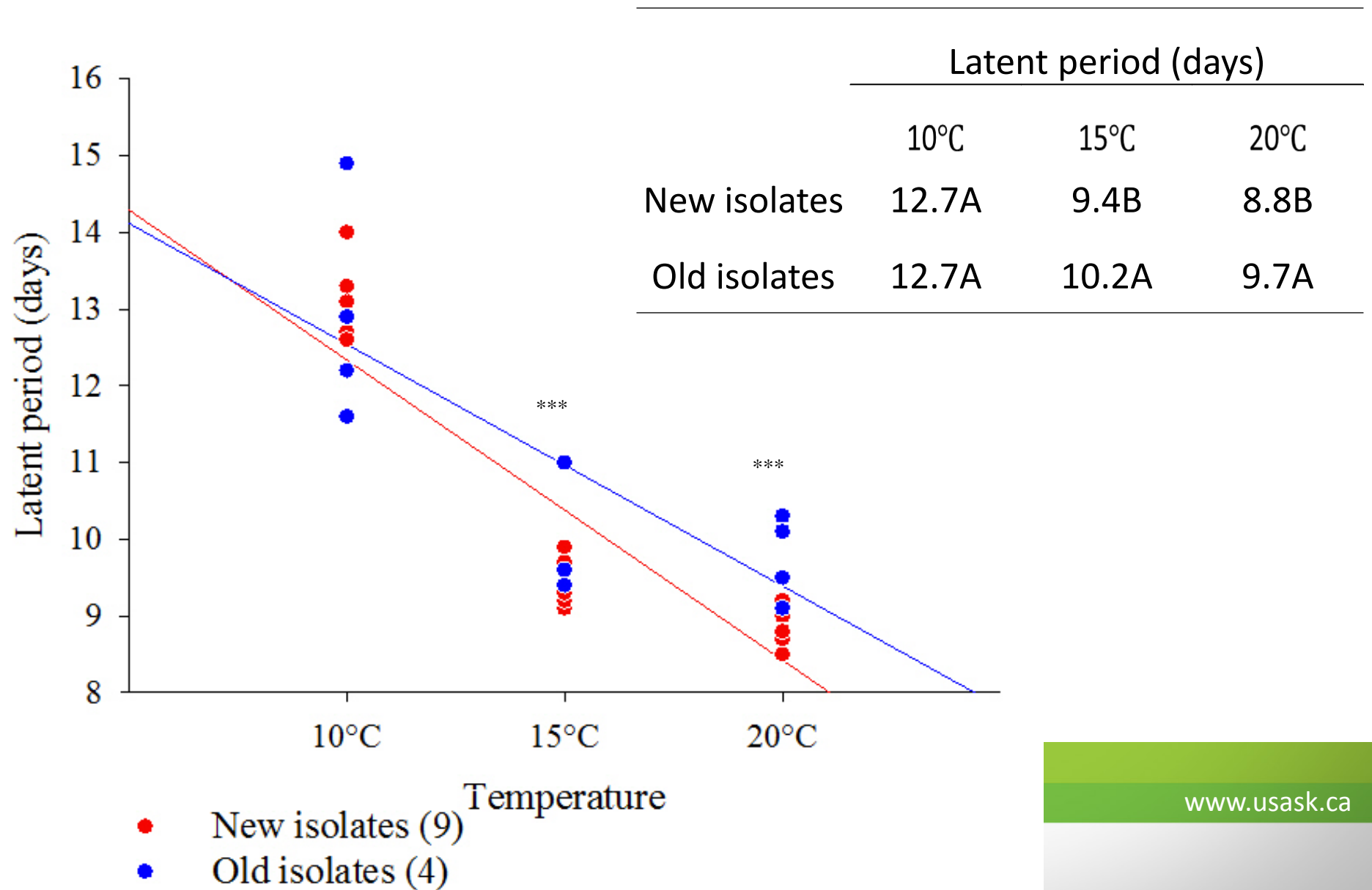
- Four susceptible cultivars: AC Barrie, AC Bellatrix, CDC NRG 003, Westdred 881
- At 10, 15 and 20°C
- Split plot design, 4 replicates



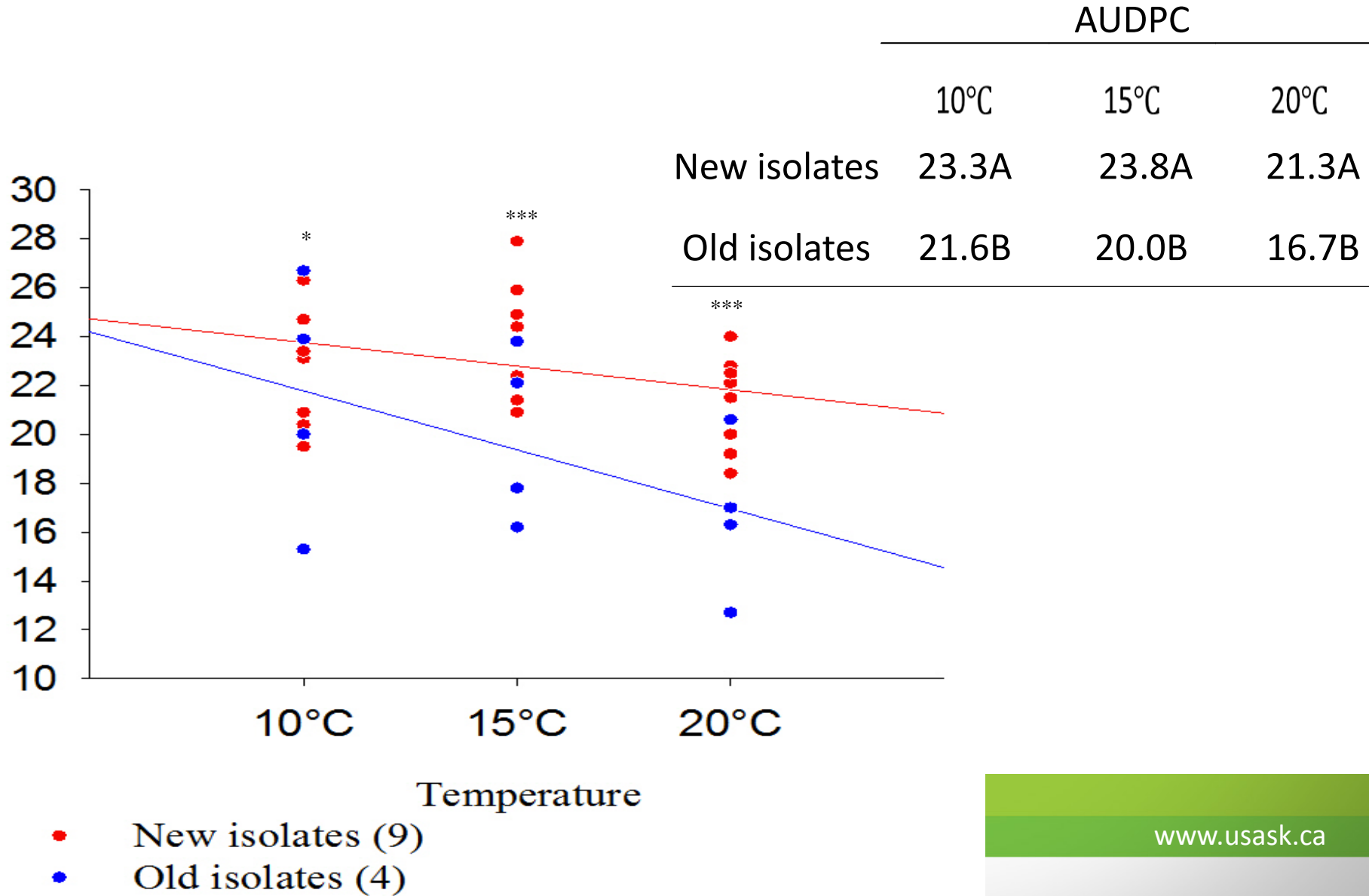
Table 1: Stripe rust seedling infection rating scale from McNeal et al. (1971)

Infection Type	Signs and Symptoms for Infection Types
0	No visible signs or symptoms
1	Necrotic and/or chlorotic flecks; no sporulation
2	Necrotic and/or chlorotic blotches or stripes; no sporulation
3	Necrotic and/or chlorotic blotches or stripes; trace sporulation
4	Necrotic and/or chlorotic blotches or stripes; light sporulation
5	Necrotic and/or chlorotic blotches or stripes; intermediate sporulation
6	Necrotic and/or chlorotic blotches or stripes; moderate sporulation
7	Necrotic and/or chlorotic blotches or stripes; abundant sporulation
8	Chlorosis behind sporulating area; abundant sporulation
9	No necrosis or chlorosis; abundant sporulation

Latent period of new and old *Pst* isolates on 4 cultivars



AUDPC of new and old *Pst* isolates on 4 cultivars



Conclusions

- Regardless new or old isolates:
 - Spore germination was greater at 5, 10 and 15°C compared with 20°C
 - Latent period was shorter at 15 and 20°C compared with 10°C

- New isolates had higher germination rates, shorter latent periods and greater AUDPC at 20°C than old isolates

Acknowledgements

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