Race Summary of *Puccinia striiformis* f. sp. *tritici* (the Wheat Stripe Rust Pathogen) and *P. striiformis* f. sp. *hordei* (the Barley Stripe Rust Pathogen) in the United States in 2014

1. **Samples.** A total of 319 stripe rust samples were collected from wheat (288), barley (24), triticale (1), rye (1), and grasses (5) from 13 states of the US and Ontario province of Canada. From the samples, 256 *P. striiformis* f. sp. *tritici* (*Pst*) and 18 *P. striiformis* f. sp. *hordei* (*Psh*) isolates were obtained.

2. **Differential sets:** All of the *Pst* isolates were tested on a set of 18 differential lines each with a single *Yr* gene and the barley isolates were tested on the set of 12 barley lines.

3. **Number of *Pst* races:** From the 256 *Pst* isolates, 33 races were identified. The numbers of virulences of the 33 races ranged from 0 to 14 of the 18 *Yr* genes.

4. **The top five *Pst* races:**

   PSTv-52 (Code: 171262) (virulent to *Yr6*, *Yr7*, *Yr8*, *Yr9*, *Yr17*, *Yr27*, *Yr43*, *Yr44*, *YrExp2*; and avirulent to *Yr1*, *Yr5*, *Yr10*, *Yr15*, *Yr24*, *Yr32*, *YrSP*, *YrTr1*, *YrTye*). Frequency at 30.86% in 2014, decreasing from 39.2% (also No.1) in 2013.
   PSTv-37 (Code: 171266) (virulent to *Yr6*, *Yr7*, *Yr8*, *Yr9*, *Yr17*, *Yr27*, *Yr43*, *Yr44*, *YrTr1*, *YrExp2*; and avirulent to *Yr1*, *Yr5*, *Yr10*, *Yr15*, *Yr24*, *Yr32*, *YrSP*, *YrTye*). Frequency at 17.97% in 2014, increasing from 13.2% (Also No. 2) in 2013.
   PSTv-4 (Code: 511211) **(**virulent to *Yr1*, *Yr6*, *Yr9*, *Yr17*, *Yr27*, *YrSP*, *YrTye*; and avirulent to *Yr5*, *Yr7*, *Yr8*, *Yr10*, *Yr15*, *Yr24*, *Yr32*, *Yr43*, *Yr44*, *YrTr1*, *YrExp2*). Frequency at 8.98% in 2014, increasing from 2.2% in 2013.
   PSTv-79 (Code: 450020) (virulent to *Yr1*, *Yr7*, *Yr9*, *Yr44*; avirulent to *Yr5*, *Yr6*, *Yr8*, *Yr10*, *Yr15*, *Yr17*, *Yr24*, *Yr27*, *Yr32*, *Yr43*, *YrSP*, *YrTr1*, *YrExp2*, *YrTye*). Frequency at 7.42% in 2014, increasing from 0.2% in 2013.
   PSTv-48 (Code: 510001) (virulent to *Yr1*, *Yr6*, *Yr9*, *YrTye*; avirulent to *Yr5*, *Yr7*, *Yr8*, *Yr10*, *Yr15*, *Yr17*, *Yr24*, *Yr27*, *Yr32*, *Yr43*, *Yr44*, *YrSP*, *YrTr1*, *YrExp2*). Frequency at 6.25% in 2014, increasing from 2.6% in 2013.

   The top two races (PSTv-52 and PSTv-37) were detected in both the western and eastern U.S., while PSTv-4, PSTv-79 and PSTv-14 were detected in only the western U.S.

5. **New races.** The following five "new" races, which were not detected in 2010 - 2013, were detected in 2014:

   PSTv-119 (Code 161262; virulent to *Yr6*, *Yr7*, *Yr8*, *Yr17*, *Yr27*, *Yr43*, *Yr44*, and *YrExp2*) was detected in western Washington. This race is similar to PSTv-78 (160262) (detected in 2013 also in western Washington), plus virulence to *Yr17*.

   PSTv-120 (Code 510211; virulent to *Yr1*, *Yr6*, *Yr9*, *Yr27*, *YrSP*, and *YrTye*) was detected in eastern Washington. This race is similar to PSTv-53 (510011) (detected in 2012 also in eastern Washington), plus virulence to *Yr27*.

PSTv-121 (Code 450031; virulent to *Yr1*, *Yr7*, *Yr9*, *Yr44*, *YrSP*, and *YrTye*) was detected in eastern Washington. This race is similar to PSTv-79 (450020) (detected in 2013 also in eastern Washington), plus virulences to *YrSP* and *YrTye*.

PSTv-122 (Code 401021; virulent to *Yr1*, *Yr17*, *Yr44*, and *YrTye*) was detected in eastern Washington.

PSTv-123 (Code 451023; virulent to *Yr1*, *Yr7*, *Yr9*, *Yr17*, *Yr44*, *YrExp2*, and *YrTye*) was detected in eastern Washington.

6. **Resistance of *Yr5* and *Yr15***. No races were found to be virulent to *Yr5* and *Yr15*, and therefore, these two genes are still effective against all races identified so far in the U.S.

7. **Races of the barley stripe rust pathogen.** Five races (PSH-33, PSH-39, PSH-44, PSH-48, and PSH-54) were detected with PSH-33 (44.4%) and PSH-48 (33.3%) as the predominant races in 2014, which were also the top two races (34.6% and 42.3%, respectively) in 2013. The two predominant races are virulent only on 1 (PSH-48) and 2 (PSH-33) of the d12 barley differentials. No new races of the barley stripe rust pathogen were detected.

Excel data and summary tables:

1. PSTsum14 including the following worksheets:
    1. Summary data of *Pst* isolates
    2. Summary data of *Pst* isolates sorted by states
    3. Summary data of *Pst* isolates sorted by epidemiological regions
    4. All PSTv races, frequencies, and distributions
    5. PSTv races and frequencies in various states
    6. PSTv races and frequencies in various epidemiological regions
    7. Frequencies of virulence to *Yr* genes used as differentials
    8. "New" PSTv races, codes, virulence formulae, type isolates, and detected states, regions and varieties.
2. PSHsum14 including the following worksheets:
    1. Summary data of *Psh* isolates
    2. Summary data sorted by races
    3. All PSH races, frequencies, and distributions