PRAIRIE WIND TRAJECTORY AND CEREAL RUST RISK REPORT for May 7-13, 2024

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Agriculture and Agri-Food Canada (AAFC) and Environment and Climate Change Canada (ECCC) have been working together to study the potential of trajectories for monitoring insect movements since the late 1990s. Trajectory models are used to deliver an early-warning system for the origin and destination of migratory invasive species, such as diamondback moth. In addition, plant pathologists have shown that trajectories can assist with the prediction of plant disease infestations and are also beginning to utilize these same data. We receive two types of model output from ECCC: reverse trajectories and forward trajectories.

'Reverse trajectories' (RT) refer to air currents that are tracked back in time from specified Canadian locations over a five-day period prior to their arrival date. Of particular interest are those trajectories that, prior to their arrival in Canada, originated over northwestern and southern USA and Mexico, anywhere diamondback moth populations overwinter and adults are actively migrating. If diamondback adults are present in the air currents that originate from these southern locations, the moths may be deposited on the Prairies at sites along the trajectory, depending on the local weather conditions at the time that the trajectories pass over our area (e.g. rain showers, etc.). Reverse trajectories are the best available estimate of the ''true'' 3D wind fields at a specific point. They are based on observations, satellite and radiosonde data.

Disclaimer

Information related to trajectory events based on forecast and diagnostic wind fields and cereal rust risk is experimental, and is **OFFERED TO THE PUBLIC FOR INFORMATIONAL PURPOSES ONLY**. Agriculture and Agri-Food Canada, Environment Canada, and their employees assume no liability from the use of this information.

1. RUST DEVELOPMENT IN SOURCE LOCATIONS

a. Pacific Northwest (PNW)

i. Dr. X Chen from USDA ARS/Washington State University has issued several risk reports and updates since January 2024. The reports indicated the risk of stripe rust for 2024 for the eastern PNW was forecast to be severe and susceptible winter wheat varieties will potentially incur yield losses (https://www.wawg.org/stripe-rust-report-warmer-november-december-dont-bode-well-for-susceptible-varieties/; https://smallgrains.wsu.edu/first-stripe-rust-forecast-of-the-2024-season/; https://www.wawg.org/march-1-stripe-rust-forecast-calling-for-epidemic-levels-for-eastern-washington/). In addition, during November 2023 surveys Dr. Chen noted stripe rust symptoms in a commercial field which "was the first time since 2018 we've seen stripe rust infection in the fall". This field was revisited in February 2024 and active stripe rust symptoms were noted by Dr. Chen (https://wagrains.org/articles/stripe-rust-is-back-for-2024-crop/).

ii. In addition, Dr. Chen has reported stripe rust symptoms in research and disease monitoring trials in Washington State including eastern regions, as well as in NE Oregon (Umatilla County). Both Drs. Chen and Murray, WSU, indicated that not since February 2011 have symptoms of stripe rust been observed this early (https://smallgrains.wsu.edu/stripe-rust-324/; https://striperust.wsu.edu/?post_type=post&p=3710; https://smallgrains.wsu.edu/stripe-rust-24/; https://twitter.com/WSUWheatDoc/status/1781009581860352487).

iii. The most recent reports and social media posts from Dr. Chen, USDA-ARS and Washington State University (WSU) and Dr. T. Murray, indicated continued development of stripe rust in research

plots and commercial fields (https://smallgrains.wsu.edu/stripe-rust-24/; https://striperust.wsu.edu/2024/04/28/stripe-rust-update-april-26-2024/; https://twitter.com/WSUWheatDoc/status/1786478714785501400). Incidence levels in commercial fields were generally low, although Dr. Chen did observe a hot spot of elevated severity in a commercial field. Dr. Chen cautions that forecast cool weather and rainfall in late April and early May could promote further development of stripe rust.

iv. Dr. C. Hagerty the Columbia Basin Agricultural Research Centre (CBARC), Oregon State University also reported stripe rust on susceptible lines at the CBARC, Pendleton, OR and encouraged growers to scout and consider fungicide application (https://osu-wams-blogs-uploads.s3.amazonaws.com/blogs.dir/2823/files/2024/04/2024_April_Rust.pdf). Recent X (formerly Twitter) posts from Dr. D. Larkin, wheat Breeder Limagrain, April 18, 2024 (https://twitter.com/dylarkin/status/1781102306593050890).

v. More recent reports and news features are indicating a risk of significant levels of stripe rust in the PNW (https://610kona.com/ixp/1144/p/stripe-rust-winter-wheat-wa/; https://wagrains.org/articles/stripe-rust-is-back-for-2024-crop/).

vi. **As of May 15, 2024, WSU/USDA rust risk forecasts for the PNW and the early occurrence of symptoms suggest there is an emerging risk that the PNW may be an important source of stripe rust inoculum for Prairie wheat growers in 2024. Further rust development in commercial PNW winter wheat fields could substantially increase this risk.**

vii. Currently there are no reports of stripe rust symptoms in Prairie winter or spring wheat crops although early development of stripe rust in disease nurseries at Abbotsford and Creston, BC have been reported by Dr. G. Brar, U of Alberta, formerly of UBC, and likely reflect overwintering on winter wheat breeding lines(https://x.com/gurcharn_brar/status/1779910374051209644).

b. **Texas/Oklahoma**

i. Stripe rust is also being observed in other areas of the USA including Texas and Oklahoma. There have been multiple reports of stripe rust in Texas and other south-central States and these early observations suggest that these areas of the US may experience severe stripe rust epidemics if conducive weather occurs (S. Baker, Stripe rust at Chillicothe, TX, CEREAL-RUST-SURVEY@LISTS.UMN.EDU, February 26, 2024; https://twitter.com/J_SBaker/status/1752818506674929882; Dr. O. Fajolu USDA, St. Paul, MN, Cereal Rust Bulletin #1, April 15, 2024, https://www.ars.usda.gov/ARSUserFiles/50620500/CRBs/2024%20CRB%20April%2015.pdf). Stripe rust was reported in Oklahoma and Kansas in a number of areas in March and April (OSU Wheat Pathology, https://twitter.com/OSUwheatdisease/status/1774552781137035533, https://twitter.com/OSUwheatdisease/status/1770869304529199247, https://twitter.com/OSUwheatdisease/status/1776637764496412894; A. Hixson, BASF, https://twitter.com/hixsona/status/1778224217810522353; J. Coltrain, Syngenta, https://twitter.com/josh_coltrain/status/1776240076290216134, https://twitter.com/josh_coltrain/status/1780357856912363741 and https://twitter.com/josh_coltrain/status/1780330445550301428; https://twitter.com/OSU_smallgrains/status/1783149298143682833).

ii. In April 2024, Dr. M. Aoun, OSU reported that stripe rust potentials are high in Oklahoma and timely scouting by farmers is encouraged (https://spotlight.okstate.edu/wheat-pathology/2024/04/02/wheat-disease-update-2-april-2024/, https://www.farms.com/videos/crops/scout-for-stripe-rust-209386.aspx). Drs. S. Liu, B. Gerrish, and J. Rudd, Texas A&M University, April 2024, have mainly reported stripe rust, but also leaf and stem rust of wheat, and crown and stem rust of oat in Texas (https://varietytesting.tamu.edu/wp-content/uploads/sites/17/2024-Wheat-Rust-Report.pdf).

iii. Further reports continued in April 2024 regarding stripe rust in Texas and Oklahoma, and these early observations suggest these regions may experience severe stripe rust epidemics if conducive

weather occurs during the rest of April and into May. Maps from AG PEST Monitor: Wheat, indicate stripe rust development in numerous counties in Oklahoma (Figure 1, https://wheat.agpestmonitor.org/stripe-rust/).

iv. Drs. S. Liu, B. Gerrish, and J. Rudd, Texas A&M University reported stripe rust, as well as leaf and stem rust of wheat, and crown and stem rust of oat in Texas (https://varietytesting.tamu.edu/wp-content/uploads/sites/17/2024-Wheat-Rust-Report.pdf).

v. In late April 2024, Dr. M. Aoun reported increased levels of stripe rust on winter wheat at Stillwater and Chickasha, OK, while leaf rust was also noted (https://twitter.com/OSUwheatdisease/status/1784421264242720939).

vi. In an article by L. Vihauer, High Plains Journal, Dr. M. Aoun indicated significant development of stripe rust in SE Oklahoma, although conditions at the time were dry and rain was needed, which will increase stripe rust risk (https://hpj.com/2024/04/19/stripe-rust-a-concern-in-oklahoma-wheat/).

vii. On April 29, 2024, Dr. B. Carver, Oklahoma State Wheat Improvement Team also mentioned continued development of leaf rust on winter wheat in central regions of Oklahoma (https://twitter.com/osuwit/status/1785003699426689353).

viii. Most recently significant levels of stripe rust were observed in research plots in Oklahoma (https://twitter.com/OSU_smallgrains/status/1790159994526347500).

ix. **As of May 15, 2024, there is a low to moderate risk associated with the Texas/Oklahoma region being a significant source of stripe rust inoculum for dispersal into the Prairie region of Canada.**

c. **Kansas/Nebraska**

i. Observations of stripe rust in Kansas winter wheat fields started on April 9, 2024, with the number of affected fields increasing during the remainder of April and into early to mid May. The most recent map (May 15, 2024) from Kansas State University and AG PEST Monitor: Wheat, indicates stripe rust development in numerous counties in Kansas (Figure 1, https://wheat.agpestmonitor.org/stripe-rust/, https://eupdate.agronomy.ksu.edu/article_new/stripe-rust-distribution-and-risk-assessment-for-kansas-april-25-2024-589-5). Although dry conditions kept this disease in check, changes in weather conditions, especially more moisture, could favour further stripe rust development (https://eupdate.agronomy.ksu.edu/article/wheat-stripe-rust-update-and-fungicide-considerations-590-10; https://eupdate.agronomy.ksu.edu/article_new/stripe-rust-distribution-and-risk-assessment-for-kansas-april-25-2024-589-5). Figure 1 shows the most recent distribution of stripe rust in 35 Kansas counties (https://kswheat.com/striperust24; https://wheat.agpestmonitor.org/stripe-rust/ (as of May 15, 2024).

ii. In addition, over the last month and especially in the last 7-10 days there have been numerous reports of stripe rust in Kansas fields on social media.

iii. In late April and early May stripe was first observed in south-central and southeast Nebraska (Dr. S. Wegulo, May 1, 2024, https://cropwatch.unl.edu/2024/wheat-disease-update-may-3-2024). Detections of both stripe rust and leaf rust have continued to increase in Nebraska, whereby Dr. S. Wegulo and colleagues from University of Nebraska, Lincoln reported an increased number of Nebraska counties with stripe rust as of May 10, 2024, while leaf rust was also found in numerous counties (Figures 2 and 3, https://cropwatch.unl.edu/2024/wheat-disease-update-stripe-rust-confirmed-nebraska).

iv. **As of May 15, 2024, there is a low-moderate risk associated with the Kansas/Nebraska region being a significant source of stripe and leaf rust inoculum for dispersal into the Prairie region of Canada.** If cooler, wetter weather occurs over the next 7-21 days the risk of stripe rust inoculum from Nebraska and neighbouring states could increase substantially.

2. Reverse trajectories (RT)

a. Since May 1, 2024 the majority of reverse trajectories that have crossed the prairies have originated from the Pacific Northwest (Idaho, Oregon and Washington).

b. Pacific Northwest (Washington, Oregon, Idaho) – Since April 1, 2024, the greatest number of reverse trajectories, crossing the Prairies, have originated from the Pacific Northwest (n=596). Most of these trajectories passed over Alberta and Saskatchewan (Figure 4). For the week of May 7-13, there have been 47 reverse trajectories that passed through the prairie region; Lethbridge reported the highest number (n=4) (Table 1).

   i. **As of May 13, 2024, there is low-moderate risk associated with the PNW region being a significant source of wind trajectories for dispersal of the stripe rust pathogen into the Prairie region of Canada.**

c. Oklahoma and Texas – Since April 1, 92 reverse trajectories, originating over Oklahoma and Texas were reported to cross the prairies (primarily crossed Manitoba and eastern Saskatchewan) (Figure 5). This past week (May 7-13) 49 trajectories were predicted to pass over 28 locations (Table 2).

   i. **As of May 13, 2024, there is low-moderate risk associated with the TX/OK region being a significant source of wind trajectories for dispersal of the stripe rust pathogen into the Prairie region of Canada.**

d. Nebraska and Kansas – A total of 131 reverse trajectories, originating from Kansas and Nebraska have crossed the prairies, primarily Manitoba and Saskatchewan (April 1 – May 13, 2024) (Figure 6). Last week (May 7-13) a total of 54 reverse trajectories passed through the prairies (Table 3).

   i. **As of May 13, 2024, there is low-moderate risk associated with the KS/NE region being a significant source of wind trajectories for dispersal of the stripe rust pathogen into the Prairie region of Canada.**

3. Prairie Crop Development, Weather Conditions, and Overwintering of Rust

a. Winter wheat – Winter wheat has been resuming growth across the prairie region in April and early to mid May with most being in early stages of development, e.g. tillering (https://www.gov.mb.ca/agriculture/crops/seasonal-reports/crop-report-archive/pubs/crop-report-2024-05-14.pdf).

b. Spring wheat – Across the prairie region spring wheat has either been planted or will be over the next few weeks with percentages of crops seeded ranging from around 4% up to 80% depending on the province and region (https://open.alberta.ca/dataset/a8632ff6-a50d-496c-8dc6-7cee941b5977/resource/2e4843fe-77c8-41af-ae36-9aa7a8b85716/download/agi-itrb-alberta-crop-report-2024-05-07.pdf; https://publications.saskatchewan.ca/api/v1/products/123595/formats/143863/download; https://www.gov.mb.ca/agriculture/crops/seasonal-reports/crop-report-archive/pubs/crop-report-2024-05-14.pdf).

c. This past week (May 6-12, 2024) the average temperature across the prairies was 12.7 °C and was 4.2 °C warmer than normal (Table 4). Prairie wide total seven day cumulative rainfall was 22.1 mm (Table 4). Weekly rainfall amounts ranged between 0.1 mm at Fairview up to 80.9 mm for Taber. The average 30 day temperature (April 13-May 12, 2024) was 7.6 °C and was 0.8 °C warmer than the long term average temperature (Table 5). The warmest location was at Alsask (9 °C); Calgary and Grande Prairie reported the lowest average temperature (6.3 °C).

d. Total rainfall (mm) over the past 30 days was 56.8 mm and was 240% of climate normal values. Brandon reported 106.6 mm and Peace River had 12.4 mm. Since April 1, the 2024 growing season has been 1.5 °C warmer than average and rain amounts have been 222% of climate normals (Table 5). The Parkland and Peace River regions have experienced above normal temperatures. Fort Vermillion has been 3 °C warmer than normal.

e. Growing season rainfall has been above normal across southern Alberta (Taber has reported 125 mm) and below normal in the Peace River region (Peace River has had 13.4 mm, Table 6). Rain amounts have been above average for most of the prairies. The Peace River region has had well below average rainfall.

Agroclimate maps are available at: https://www.agr.gc.ca/DW-GS/current-actuelles.jspx?lang=eng&jsEnabled=true.

f. Currently, there are no reports of early season stripe rust development in winter wheat, which would suggest potential overwintering, especially of stripe rust (personal communication: S. Rehman, R. Aboukhaddour, AAFC Lethbridge; and H.R. Kutcher, U. of S.).

4. Overall Rust Risk Assessment and Need For In-Crop Scouting

a. **Pacific Northwest** – There were low to moderate numbers of reverse wind trajectories that passed over the PNW region and into the prairies, while stripe rust development is continuing, although levels are generally low, especially in commercial winter wheat fields in the PNW. Prairie winter wheat crops have resumed growth, while much of the spring wheat crop has just been seeded or will be seeded over the next two weeks. **Overall as of May 13, 2024 the risk of stripe rust appearance from the PNW is limited and scouting for this disease in the Prairie region is generally not urgent** (Figure 7).

b. **Texas-Oklahoma corridor** – There were relatively low numbers of reverse wind trajectories that passed over the TX/OK region and into the prairies, while stripe and leaf rust development are continuing, albeit levels are generally low, especially in commercial winter wheat fields in this region. Prairie winter wheat crops have resumed growth, while much of the spring wheat crop has just been seeded or will be seeded over the next two weeks. **Overall as of May 13, 2024 the risk of stem, leaf, stripe, and crown rust appearance from the Texas-Oklahoma corridor is limited and scouting for these diseases in the Prairie region is not urgent** (Figure 8).

c. **Kansas-Nebraska corridor** – There were relatively low numbers of reverse wind trajectories that passed over the KS/NE region and into the prairies, while stripe and leaf rust development are continuing, albeit levels are generally low, especially in commercial winter wheat fields in this region. Prairie winter wheat crops have resumed growth, while much of the spring wheat crop has just been seeded or will be seeded over the next two weeks. **Overall as of May 13, 2024 the risk of stem, leaf, stripe, and crown rust appearance from the Kansas-Nebraska corridor is limited and scouting for these diseases in the Prairies is not urgent** (Figure 9).

d. The early and wide spread appearance of stripe rust in the PNW, TX/OK and KS/NE regions is concerning. Over the next 2-4 weeks if favourable weather conditions (especially more rainfall) occur in these source US regions, further stripe and leaf rust development could occur. This would result in more rust spores being available to be blown into the Prairie region, as well as more northerly rust development into the Dakotas and Minnesota/Wisconsin. Currently, Prairie winter wheat fields that have started to regrow are most at risk, but fortunately most current winter wheat varieties have intermediate to high levels of resistance, although AC Radiant, CDC Buteo, AAC Elevate, Broadview, and CDC Falcon are rated as susceptible (https://www.seed.ab.ca/variety-data/cereals/; https://saskseed.ca/wp-content/uploads/2020/12/2024-Varieties-of-Grain-Crops.pdf; https://www.seedmb.ca/pdf-editions-and-separate-section-pdfs/). If you are growing a stripe rust susceptible variety it will be important to keep an eye on your crops and follow further PCDMN cereal risk updates (https://prairiecropdisease.blogspot.com/).

e. Where farmers or consultants noticed stripe rust development on winter wheat in the fall of 2023, it is recommended to scout winter wheat fields that have resumed growth in spring 2024. Scouting is especially critical where the variety being grown is susceptible/moderately susceptible to stripe rust. Currently, there are no early spring reports of stripe rust on winter wheat.

5. Contacts for rust research and extension expertise

a. **Research**

i. Reem Aboukhaddour, A. Laroche, AAFC Lethbridge, AB, reem.aboukhaddour@agr.gc.ca, andre.laroche@agr.gc.ca. Stripe rust;
ii. H.R. Kutcher, University of Saskatchewan, Saskatoon, SK, randy.kutcher@usask.ca. Stripe rust;
iii. B. McCallum, AAFC Morden, MB, brent.mccallum@agr.gc.ca. Leaf rust and stripe rust;
iv. J. Menzies, AAFC Brandon/Morden, MB, jim.menzies@agr.gc.ca. Stem rust of wheat and oat, crown rust of oat.
v. S. Rehman, Western Crop Innovations (formerly Olds College), Field Crop Development Centre, Lacombe, AB, srehman@oldscollege.ca. Stripe and leaf rust;
vi. G. Brar, University of Alberta, gurcharn.brar@ualberta.ca. Stripe rust.

b. **Extension**

i. Alberta Ministry of Agriculture and Irrigation, Mike Harding, michael.harding@gov.ab.ca;
ii. Saskatchewan Ministry of Agriculture, Alireza Akhavan, alireza.akhavan@gov.sk.ca;
iii. Manitoba Ministry of Agriculture, David Kaminski, david.kaminski@gov.mb.ca.

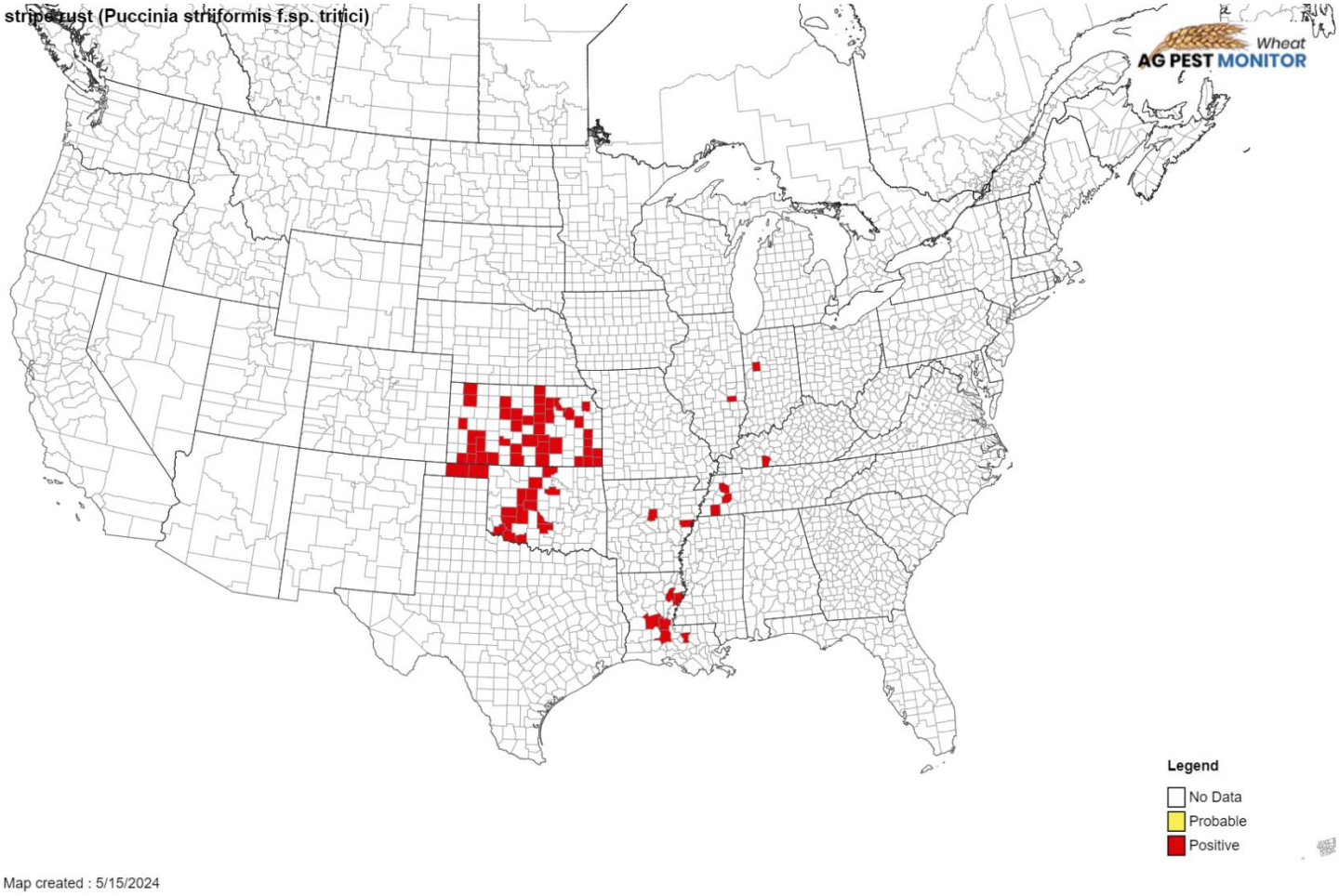

Figure 1. USA stripe rust observations, May 15, 2024, courtesy of AG PEST MONITOR: Wheat, https://wheat.agpestmonitor.org/stripe-rust/.

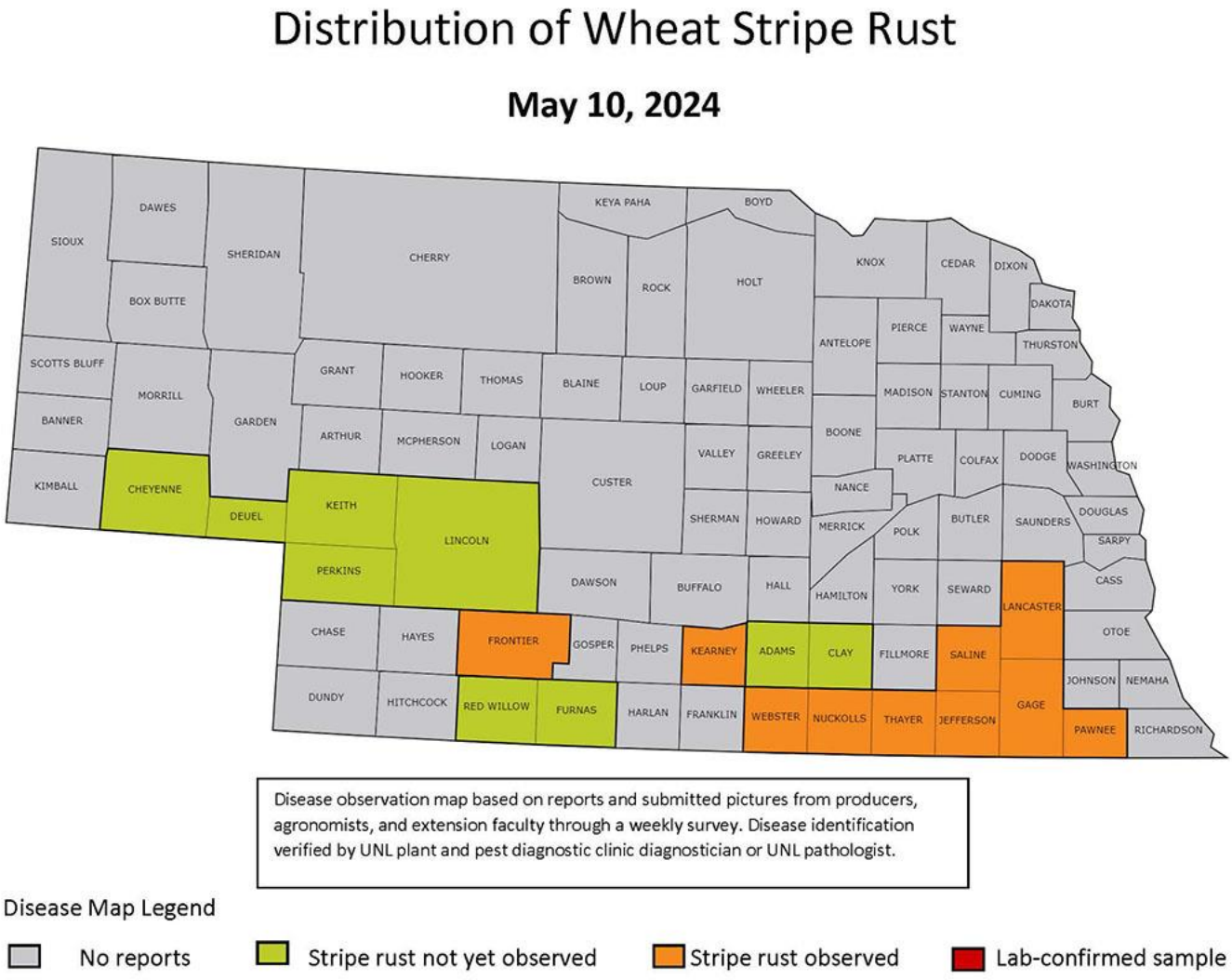

Figure 2. Stripe rust detections in Nebraska counties as of May 10, 2024 (Dr. S. Wegulo et al. May 10, 2024, https://cropwatch.unl.edu/2024/wheat-disease-update-stripe-rust-confirmed-nebraska).

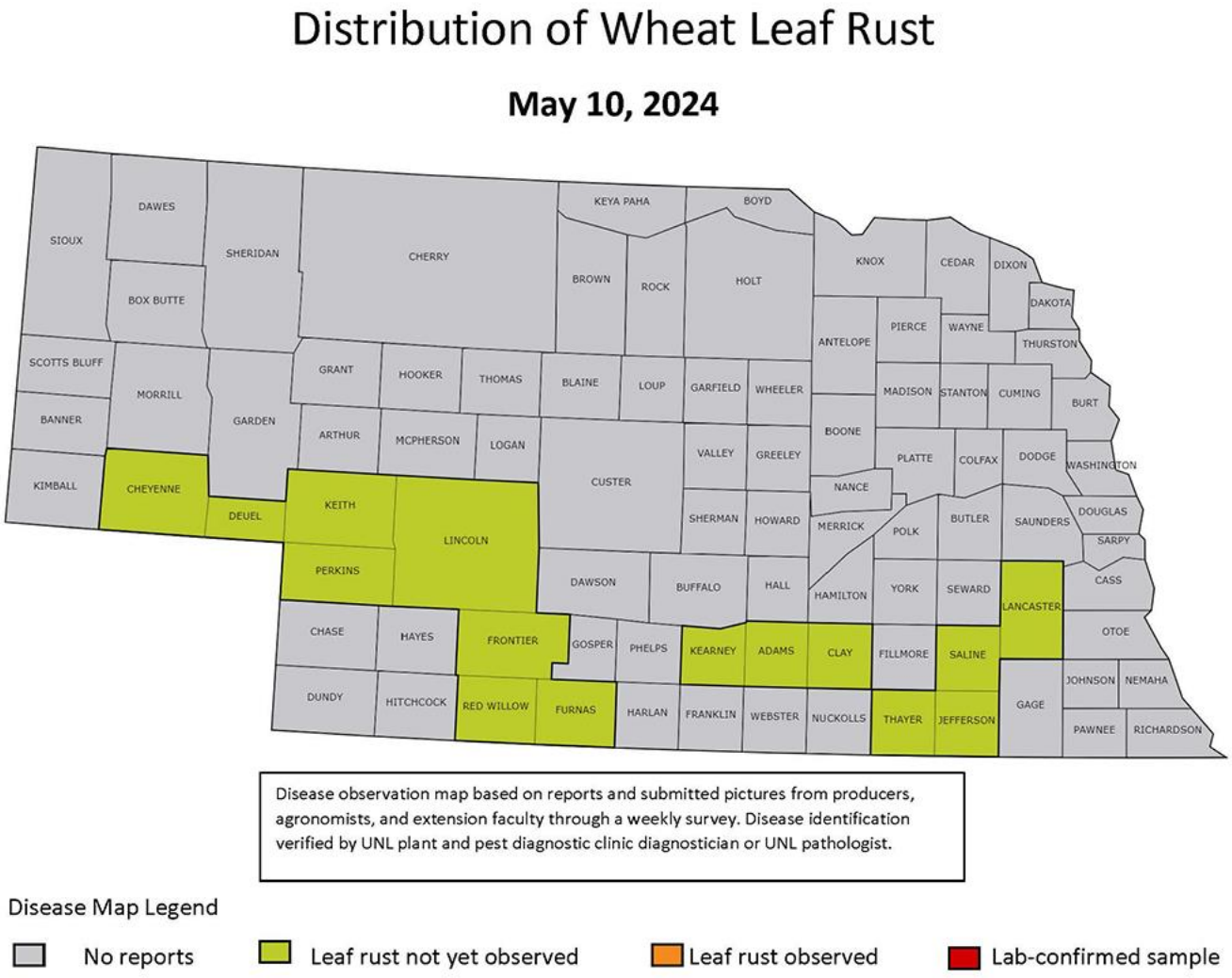

Figure 3. Leaf rust detections in Nebraska counties as of May 10, 2024 (Dr. S. Wegulo et al. May 10, 2024, https://cropwatch.unl.edu/2024/wheat-disease-update-stripe-rust-confirmed-nebraska).

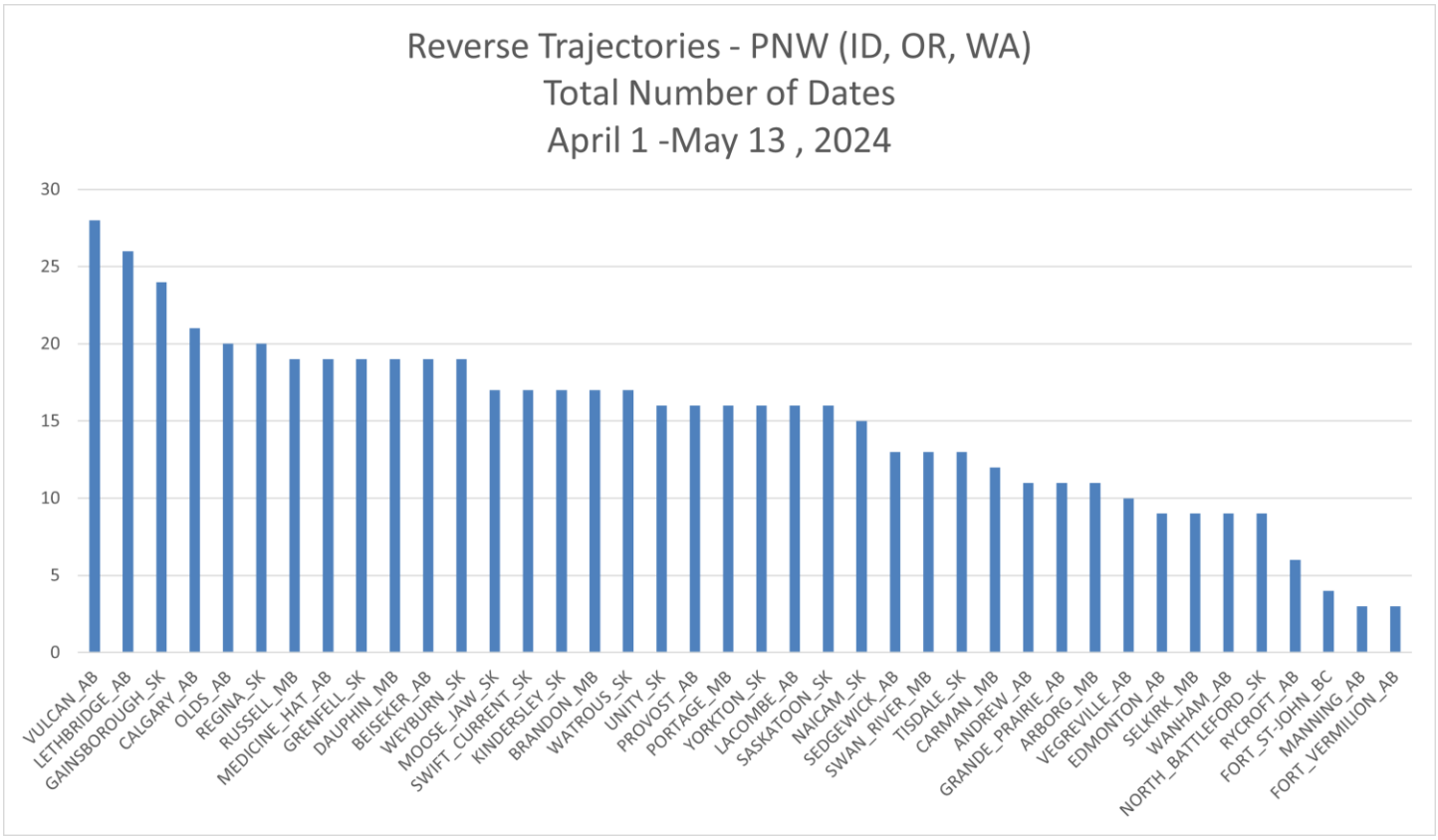

Figure 4. Reverse trajectory locations and number of events, for reverse trajectory events originating from the Pacific Northwest region of the USA, April 1 – May 13, 2024.

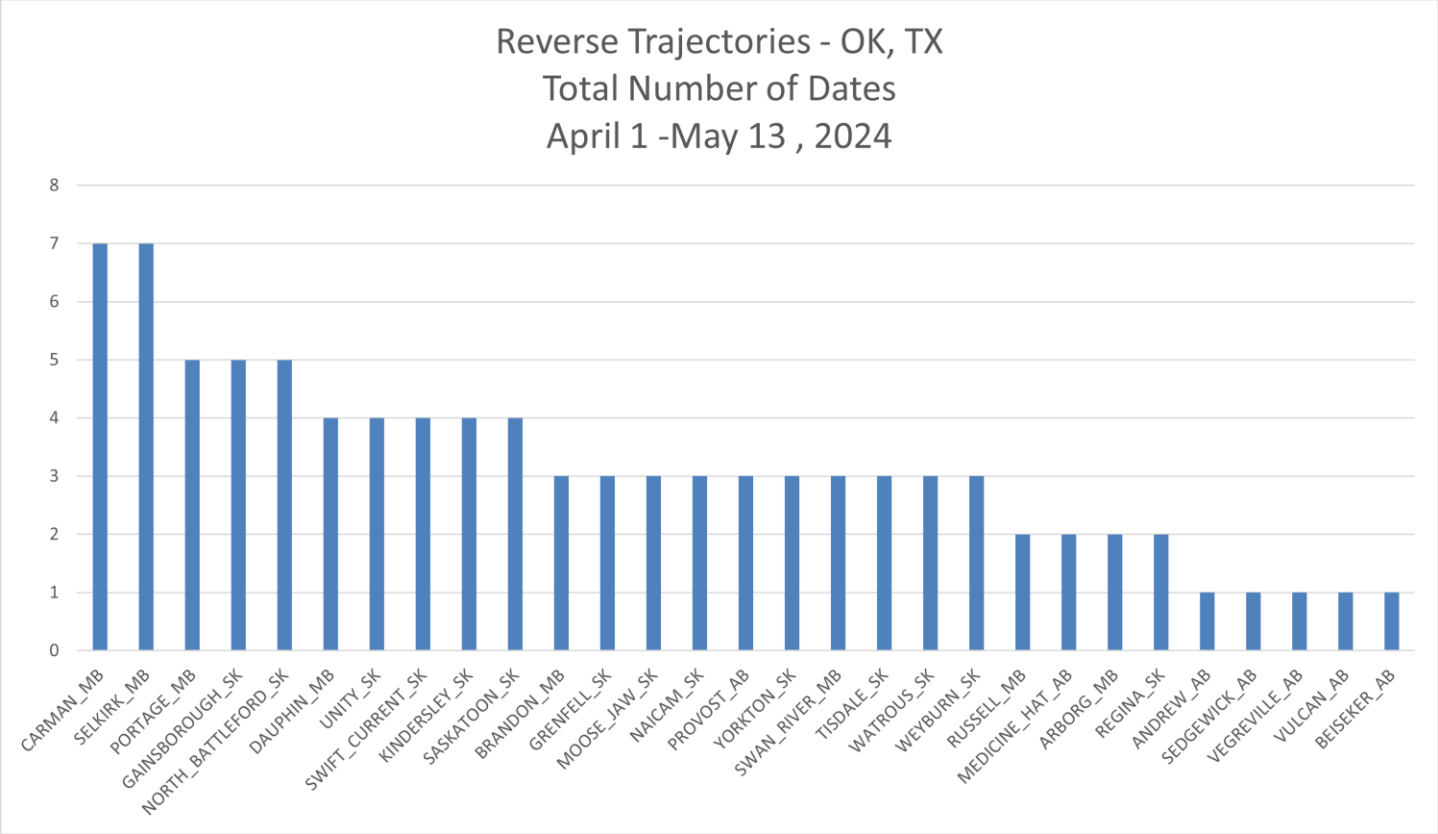

Figure 5. Reverse trajectory locations and number of events, for reverse trajectory events originating from Oklahoma and Texas, USA, April 1 – May 13, 2024.

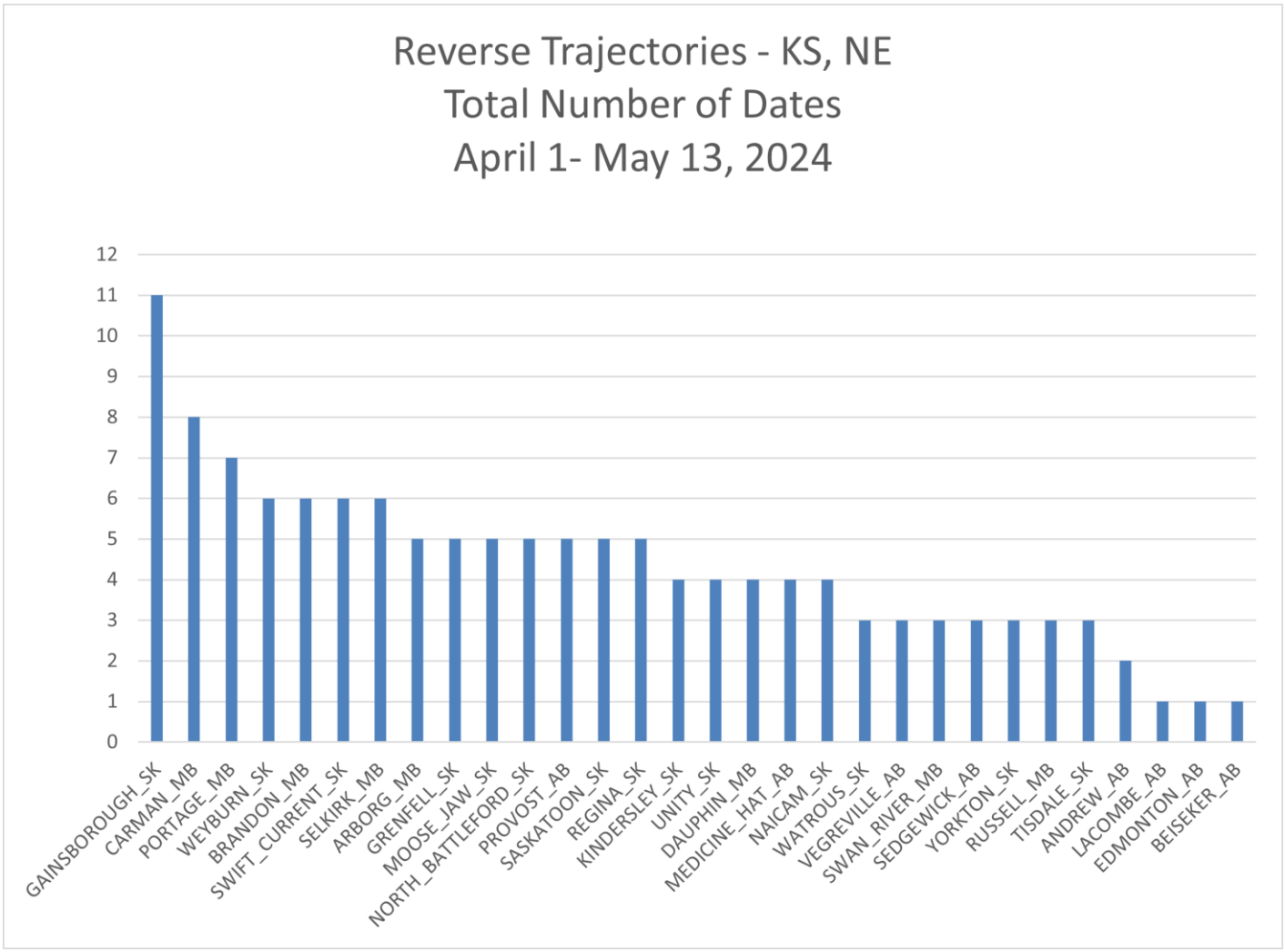

Figure 6. Reverse trajectory locations and number of events, for reverse trajectory events originating from Kansas and Nebraska, USA, April 1 – May 13, 2024.

Table 1. Reverse trajectory locations, arrival dates, and number of events, for reverse trajectory events originating from the Pacific Northwest region of the USA, May 7-13, 2024.

Location	Prov	7-May-24	8-May-24	9-May-24	10-May-24	11-May-24	12-May-24	13-May-24	Total trajectories /location
ANDREW	AB	1							1
BEISEKER	AB	1							1
BRANDON	MB		1	1			1		3
CALGARY	AB	1							1
CARMAN	MB		1						1
DAUPHIN	MB	1	1		1				3
EDMONTON	AB	1							1
FORT VERMILION	AB	1							1
GAINSBOROUGH	SK	1	1				1		3
GRANDE PRAIRIE	AB	1							1
KINDERSLEY	SK	1							1
LACOMBE	AB	1							1
LETHBRIDGE	AB	1		1			1	1	4
MANNING	AB	1							1
MEDICINE HAT	AB	1						1	2
MOOSE JAW	SK			1					1
NAICAM	SK			1					1
OLDS	AB	1							1
PORTAGE	MB		1				1		2
PROVOST	AB	1						1	2
REGINA	SK	1	1						2
SASKATOON	SK			1					1
SEDGEWICK	AB	1		1					2
SWAN RIVER	MB			1					1
TISDALE	SK		1	1					2
VEGREVILLE	AB	1	1						2
VULCAN	AB	1			1				2
WANHAM	AB	1							1
WATROUS	SK	1							1
WEYBURN	SK			1					1
Total trajectories per date		21	8	9	2		4	3	47

Table 2. Reverse trajectory locations, arrival dates, and number of events, for reverse trajectory events originating from Oklahoma and Texas, USA, May 7-13, 2024.

Location	Prov	7-May-24	8-May-24	9-May-24	10-May-24	11-May-24	12-May-24	13-May-24	Total trajectories /location
ANDREW	AB	1							1
ARBORG	MB	1	1						2
BEISEKER	AB			1					1
BRANDON	MB	1	1						2
CARMAN	MB	1	1						2
DAUPHIN	MB	1	1						2
GAINSBOROUGH	SK	1	1						2
GRENFELL	SK	1	1						2
KINDERSLEY	SK		1	1					2
MEDICINE HAT	AB			1					1
MOOSE JAW	SK	1							1
NAICAM	SK	1	1						2
NORTH BATTLEFORD	SK	1	1	1					3
PORTAGE	MB	1	1						2
PROVOST	AB		1	1					2
REGINA	SK	1							1
RUSSELL	MB	1							1
SASKATOON	SK	1	1						2
SEDGEWICK	AB		1						1
SELKIRK	MB	1	1						2
SWAN RIVER	MB	1	1						2
SWIFT CURRENT	SK	1	1						2
TISDALE	SK	1	1						2
UNITY	SK		1	1					2
VULCAN	AB			1					1
WATROUS	SK	1	1						2
WEYBURN	SK	1	1						2
YORKTON	SK	1	1						2
Total trajectories per date		21	21	7	49	0	0	0	49

Table 3. Reverse trajectory locations, arrival dates, and number of events, for reverse trajectory events originating from Kansas and Nebraska, USA, May 7-13, 2024.

Location	Prov	7-May-24	8-May-24	9-May-24	10-May-24	11-May-24	12-May-24	13-May-24	Total trajectories /location
ANDREW	AB	1							1
ARBORG	MB	1							1
BEISEKER	AB			1					1
BRANDON	MB	1	1						2
CARMAN	MB	1	1						2
DAUPHIN	MB	1							1
EDMONTON	AB	1							1
GAINSBOROUGH	SK	1	1	1					3
GRENFELL	SK	1	1						2
KINDERSLEY	SK	1		1					2
LACOMBE	AB		1						1
MEDICINE HAT	AB			1					1
MOOSE JAW	SK	1							1
NAICAM	SK	1	1	1					3
NORTH BATTLEFORD	SK	1	1	1					3
PORTAGE	MB	1	1						2
PROVOST	AB	1	1	1					3
REGINA	SK	1	1						2
RUSSELL	MB	1							1
SASKATOON	SK	1	1						2
SEDGEWICK	AB	1	1	1					3
SELKIRK	MB	1							1
SWAN RIVER	MB	1	1						2
SWIFT CURRENT	SK	1	1	1					3
TISDALE	SK	1	1						2
UNITY	SK	1		1					2
VEGREVILLE	AB	1	1						2
WATROUS	SK	1							1
WEYBURN	SK	1	1						2
YORKTON	SK	1							1
Total trajectories per date		27	17	10	0	0	0	0	54

Table 4. Seven day weather synopsis (temperature (Tavg, °C), observed temperature difference (°C) from climate normal, rain (mm) and rain percent of climate normal (%) for observed (OBS) and climate normal (CN) values across the Canadian prairies for the period of May 6-12, 2024.

Location	Tavg (OBS)	Tavg (CN)	Tavg OBS difference from Climate Normals	Rain (OBS)	Rain (CN)	% Of Normal
Alsask	14.0	9.7	4.3	37.3	4.5	822.3
Assiniboia	13.2	8.6	4.6	34.8	10.4	335.4
Beaverlodge	11.3	8.1	3.2	0.9	5.5	16.4
Bonneyville	11.6	8.6	3.0	32.2	5.1	626.3
Brandon	13.4	9.2	4.2	18.3	16.4	111.5
Brooks	12.6	9.3	3.3	44.0	5.4	813.5
Calgary	11.5	7.7	3.8	8.2	9.5	86.7
Canora	13.7	8.3	5.3	14.6	7.2	203.9
Carman	13.6	9.9	3.8	1.6	15.7	10.2
Cartwright	13.3	9.3	4.0	14.9	16.0	92.8
Coronach	13.0	8.5	4.4	47.3	11.8	402.2
Dauphin	13.3	7.2	6.1	6.3	10.0	62.9
Dawson Creek	12.0	6.5	5.5	2.7	4.4	61.4
Drumheller	11.9	8.6	3.3	38.9	5.9	659.0
Edmonton	11.2	8.4	2.8	29.6	6.0	496.6
Elbow	13.6	9.0	4.6	25.5	9.0	281.9
Estevan	13.1	9.5	3.6	35.3	12.2	289.4
Fairview	12.4	8.5	3.9	0.1	3.2	1.5
Fort St. John	12.2	6.9	5.3	3.1	4.2	73.8
Fort Vermilion	12.6	7.0	5.6	9.1	4.1	224.3
Fox Valley	13.8	9.3	4.5	39.2	7.0	562.0
Grande Prairie	11.2	8.5	2.7	0.4	4.6	8.5
Hanna	12.4	8.6	3.9	50.6	5.2	972.7
High Level	11.9	7.6	4.2	5.0	2.6	194.9
Hudson Bay	12.7	7.1	5.6	8.8	4.9	178.5
Kindersley	13.0	8.8	4.2	21.8	4.7	467.4
La Crete	12.0	7.7	4.3	7.7	2.8	275.1
Lacombe	11.3	7.8	3.5	27.2	6.8	397.7
Lethbridge	11.5	8.4	3.1	49.2	8.5	579.5
Lloydminster	11.5	8.4	3.1	27.1	4.9	554.8
Manning	12.9	7.8	5.0	1.3	3.3	38.1
Maple Creek	13.8	9.1	4.7	59.7	8.6	694.5
Mayerthorpe	12.2	8.2	4.0	10.9	5.9	184.4
Meadow Lake	11.2	7.3	3.8	10.7	3.2	331.9
Medicine Hat	13.1	9.3	3.8	72.2	7.7	934.2
Melfort	13.1	8.0	5.1	13.9	6.0	232.6
Melita	13.6	9.6	4.0	36.5	12.8	284.5

Table 4 continued. Seven day weather synopsis (temperature (Tavg, °C), observed temperature difference (°C) from climate normal, rain (mm) and rain percent of climate normal (%) for observed (OBS) and climate normal (CN) values across the Canadian prairies for the period of May 6-12, 2024.

Location	Tavg (OBS)	Tavg (CN)	Tavg OBS difference from Climate Normals	Rain (OBS)	Rain (CN)	% Of Normal
Melville	13.1	8.3	4.9	14.3	7.5	191.2
Minnedosa	13.1	8.9	4.2	19.7	13.0	151.7
Morden	13.8	9.9	3.9	8.1	16.0	50.2
Namao	11.3	8.4	2.9	30.4	5.4	559.5
Nipawin	13.3	7.8	5.5	10.6	5.0	213.1
North Battleford	12.4	8.2	4.2	12.8	5.2	246.5
Oyen	13.0	8.6	4.4	47.6	3.7	1285.9
Peace River	12.8	8.6	4.2	0.6	3.1	20.3
Portage La Prairie	13.7	9.4	4.4	2.3	15.3	15.2
Prince Albert	13.2	8.2	5.0	14.0	5.9	238.2
Red Deer	11.2	7.9	3.3	16.3	7.6	213.8
Regina	12.9	9.1	3.8	28.4	9.7	292.9
Roblin	13.1	7.5	5.7	20.8	8.9	233.8
Rosetown	13.0	9.1	3.9	29.1	6.8	427.6
Saskatoon	13.3	8.9	4.3	15.1	7.7	197.4
Scott	12.1	8.6	3.4	14.6	4.4	334.4
Steinbach	13.9	9.6	4.3	6.0	14.6	41.0
Swan River	13.5	6.8	6.7	5.3	8.8	60.3
Swift Current	13.8	8.5	5.3	30.0	9.5	316.7
Taber	11.4	9.0	2.4	80.9	7.7	1055.1
Tisdale	13.1	8.0	5.1	9.0	5.7	158.3
Valley View	12.0	8.1	3.8	0.2	4.6	3.5
Vanguard	14.0	8.8	5.2	24.7	9.5	259.0
Vauxhall	12.6	9.5	3.1	70.0	6.2	1122.8
Vegreville	11.1	8.7	2.4	34.8	5.7	609.6
Virden	13.4	9.1	4.2	30.7	12.5	245.4
Watrous	13.5	8.6	4.8	19.0	8.3	228.3
Weyburn	13.0	9.2	3.8	28.2	11.0	257.3
Winnipeg	14.3	9.4	4.9	4.1	13.0	31.6
Wynyard	13.0	8.2	4.8	19.4	7.6	256.0
Yorkton	13.2	8.5	4.7	12.1	8.0	151.2

Table 5. 30 day weather synopsis (temperature (Tavg, °C), observed temperature difference (°C) from climate normal, rain (mm) and rain percent of climate normal (%) for observed (OBS) and climate normal (CN) values across the Canadian prairies for the period of April 13 – May 12, 2024.

Location	Tavg (OBS)	Tavg (CN)	Tavg OBS difference from Climate Normals	Rain (OBS)	Rain (CN)	% Of Normal
Alsask	9.0	8.2	0.8	61.7	17.7	348.5
Assiniboia	8.2	7.2	1.0	61.4	24.8	247.6
Beaverlodge	6.4	6.4	-0.1	20.0	15.6	127.9
Bonneyville	6.9	6.7	0.2	70.2	22.1	318.2
Brandon	8.4	7.3	1.1	106.6	36.2	294.3
Brooks	8.3	7.9	0.3	65.5	21.9	298.7
Calgary	6.3	6.6	-0.2	35.4	27.8	127.4
Canora	7.4	6.4	1.0	50.3	24.1	208.8
Carman	8.7	7.7	1.1	63.6	35.0	181.5
Cartwright	8.1	7.3	0.8	99.7	35.1	284.4
Coronach	8.1	7.2	0.9	57.7	27.9	206.5
Dauphin	7.8	5.2	2.6	54.1	29.6	182.8
Dawson Creek	6.7	4.8	1.8	28.4	15.7	181.5
Drumheller	7.2	7.2	0.0	56.6	23.7	239.0
Edmonton	6.7	6.8	-0.1	50.3	24.2	207.9
Elbow	8.1	7.5	0.6	83.2	20.2	411.2
Estevan	8.1	7.8	0.3	69.4	30.5	227.4
Fairview	7.0	6.6	0.4	19.6	14.0	139.5
Fort St. John	7.1	5.2	1.9	31.1	17.4	178.4
Fort Vermilion	7.9	4.9	3.0	23.5	12.6	186.9
Fox Valley	8.5	8.0	0.6	65.8	22.5	292.8
Grande Prairie	6.3	6.8	-0.5	19.7	15.7	125.8
Hanna	7.8	7.2	0.7	62.4	21.6	288.5
High Level	7.3	5.5	1.8	19.9	12.4	161.4
Hudson Bay	6.9	5.2	1.7	63.5	20.1	316.3
Kindersley	7.8	7.2	0.7	63.3	19.1	332.3
La Crete	7.7	5.6	2.2	13.4	11.7	114.2
Lacombe	6.7	6.3	0.4	50.4	24.7	204.1
Lethbridge	7.1	7.3	-0.2	76.5	28.5	268.8
Lloydminster	6.9	6.5	0.3	56.1	22.0	254.9
Manning	7.2	5.8	1.4	17.6	15.3	115.3
Maple Creek	8.5	7.9	0.6	80.4	24.6	327.5
Mayerthorpe	7.0	6.6	0.4	32.8	22.8	143.7
Meadow Lake	6.5	5.5	1.0	35.2	18.9	186.1
Medicine Hat	8.2	8.0	0.1	100.4	22.9	437.9
Melfort	7.1	6.1	1.0	57.9	19.6	296.0
Melita	8.4	7.7	0.6	75.4	32.1	234.6

Table 5 continued. 30 day weather synopsis (temperature (Tavg, °C), observed temperature difference (°C) from climate normal, rain (mm) and rain percent of climate normal (%) for observed (OBS) and climate normal (CN) values across the Canadian prairies for the period of April 13 – May 12, 2024.

Location	Tavg (OBS)	Tavg (CN)	Tavg OBS difference from Climate Normals	Rain (OBS)	Rain (CN)	% Of Normal
Melville	7.4	6.5	0.8	44.9	24.9	180.6
Minnedosa	7.8	7.0	0.9	87.8	33.1	265.1
Morden	8.9	7.7	1.2	83.8	34.8	240.6
Namao	6.9	6.6	0.3	60.6	22.5	269.5
Nipawin	7.4	5.9	1.5	54.6	19.0	287.5
North Battleford	7.3	6.4	0.9	52.7	22.9	230.2
Oyen	7.8	7.1	0.8	68.2	16.2	421.3
Peace River	7.3	6.7	0.6	12.4	15.1	82.0
Portage La Prairie	8.5	7.2	1.3	65.4	34.3	190.5
Prince Albert	7.1	6.4	0.7	58.2	20.8	279.7
Red Deer	6.4	6.5	-0.1	31.8	26.5	119.8
Regina	8.1	7.6	0.5	51.3	25.2	203.6
Roblin	7.3	5.5	1.8	70.0	27.1	258.4
Rosetown	7.8	7.5	0.3	69.8	20.3	343.6
Saskatoon	7.8	7.3	0.5	57.0	21.3	267.3
Scott	7.3	6.8	0.4	49.3	20.6	238.8
Steinbach	8.3	7.3	1.0	69.4	34.8	199.3
Swan River	7.7	4.9	2.8	67.0	31.1	215.7
Swift Current	8.3	7.2	1.1	60.6	22.5	269.8
Taber	7.2	7.8	-0.6	101.3	26.3	384.6
Tisdale	7.1	6.1	1.0	57.9	18.9	306.1
Valley View	6.7	6.4	0.3	21.2	16.7	127.4
Vanguard	8.4	7.5	1.0	53.4	22.0	243.3
Vauxhall	8.2	8.3	-0.1	89.1	23.0	388.2
Vegreville	6.7	6.9	-0.2	68.6	22.8	300.6
Virden	8.1	7.3	0.8	74.5	31.2	238.9
Watrous	7.8	7.0	0.8	60.9	23.6	258.5
Weyburn	8.1	7.7	0.4	52.5	29.2	179.9
Winnipeg	8.7	7.2	1.5	60.8	30.8	197.1
Wynyard	7.1	6.4	0.7	71.2	23.3	305.9
Yorkton	7.5	6.7	0.8	38.6	25.9	148.7

Table 6. Growing season weather synopsis (temperature (Tavg, °C), observed temperature difference (°C) from climate normal, rain (mm) and rain percent of climate normal (%) for observed (OBS) and climate normal (CN) values across the Canadian prairies for the period of April 1- May 12, 2024.

Location	Tavg (OBS)	Tavg (CN)	Tavg OBS difference from Climate Normals	Rain (OBS)	Rain (CN)	% Of Normal
Alsask	8.2	6.9	1.3	70.8	21.2	334.7
Assiniboia	7.9	5.9	2.0	61.8	28.6	216.2
Beaverlodge	5.6	5.2	0.4	23.1	19.4	119.1
Bonneyville	6.4	5.2	1.2	74.6	26.9	277.6
Brandon	7.3	5.6	1.7	107.6	43.5	247.3
Brooks	7.4	6.7	0.7	86.8	26.4	329.3
Calgary	5.8	5.4	0.4	50.1	32.3	154.8
Canora	6.1	4.7	1.4	51.4	29.6	173.7
Carman	7.8	6.0	1.7	64.7	44.2	146.3
Cartwright	7.2	5.6	1.5	101.7	43.8	232.3
Coronach	7.8	5.9	1.9	58.0	32.7	177.5
Dauphin	6.6	3.5	3.1	60.0	34.7	173.1
Dawson Creek	5.8	3.5	2.3	30.6	20.7	147.3
Drumheller	6.5	5.9	0.5	71.1	26.8	265.1
Edmonton	6.1	5.4	0.7	55.4	29.2	189.6
Elbow	7.6	6.1	1.5	83.7	23.8	351.1
Estevan	7.5	6.3	1.2	70.7	36.0	196.3
Fairview	6.0	5.1	1.0	21.0	18.1	115.9
Fort St. John	6.1	3.8	2.3	32.6	21.8	149.2
Fort Vermilion	6.7	3.2	3.5	29.0	14.9	194.6
Fox Valley	7.9	6.7	1.2	79.2	26.9	294.5
Grande Prairie	5.5	5.5	0.1	27.8	19.1	145.8
Hanna	7.0	5.9	1.1	79.1	24.8	318.9
High Level	5.8	3.7	2.1	33.0	14.7	224.1
Hudson Bay	6.4	3.5	2.9	65.4	24.4	267.9
Kindersley	7.3	5.8	1.5	69.7	23.8	293.2
La Crete	6.3	3.7	2.5	19.9	14.0	141.7
Lacombe	6.1	5.0	1.1	56.4	29.3	192.3
Lethbridge	6.8	6.2	0.6	103.4	36.9	280.5
Lloydminster	6.3	5.0	1.3	60.7	27.3	222.3
Manning	6.4	4.2	2.2	19.1	19.5	98.1
Maple Creek	7.9	6.7	1.2	101.8	28.7	355.0
Mayerthorpe	6.2	5.3	0.9	38.9	27.3	142.3
Meadow Lake	6.0	3.9	2.1	37.7	22.9	164.9
Medicine Hat	7.6	6.8	0.7	120.5	27.1	445.2
Melfort	6.5	4.4	2.1	60.1	23.3	258.1
Melita	7.4	6.1	1.3	76.8	38.3	200.2

Table 6 continued. Growing season weather synopsis (temperature (Tavg, °C), observed temperature difference (°C) from climate normal, rain (mm) and rain percent of climate normal (%) for observed (OBS) and climate normal (CN) values across the Canadian prairies for the period of April 1- May 12, 2024.

Location	Tavg (OBS)	Tavg (CN)	Tavg OBS difference from Climate Normals	Rain (OBS)	Rain (CN)	% Of Normal
Melville	6.4	4.9	1.4	45.6	29.8	152.9
Minnedosa	6.9	5.3	1.6	88.1	39.3	223.8
Morden	7.9	6.1	1.8	85.3	43.9	194.3
Namao	6.3	5.2	1.0	63.2	27.8	227.1
Nipawin	6.7	4.1	2.6	58.2	23.2	251.1
North Battleford	6.7	4.8	1.9	54.7	27.9	196.1
Oyen	7.2	5.8	1.5	75.3	19.0	396.4
Peace River	6.4	5.2	1.2	13.4	18.6	71.9
Portage La Prairie	7.4	5.6	1.9	67.4	42.2	159.5
Prince Albert	6.6	4.7	1.9	63.9	24.8	257.8
Red Deer	5.7	5.2	0.5	41.5	30.6	135.7
Regina	7.6	6.1	1.5	51.3	28.7	178.7
Roblin	6.1	3.8	2.3	72.5	32.8	221.0
Rosetown	7.2	6.1	1.1	78.1	25.2	310.1
Saskatoon	7.4	5.8	1.5	60.5	25.3	239.5
Scott	6.7	5.3	1.3	51.8	25.7	201.3
Steinbach	7.2	5.7	1.6	73.1	41.5	176.3
Swan River	6.7	3.3	3.5	69.9	36.9	189.5
Swift Current	7.7	5.9	1.8	63.0	26.2	240.4
Taber	6.9	6.7	0.2	125.2	32.7	383.0
Tisdale	6.5	4.4	2.2	61.1	22.9	266.7
Valley View	5.9	5.1	0.9	35.3	20.4	173.2
Vanguard	7.9	6.2	1.7	55.0	25.4	216.1
Vauxhall	7.6	7.1	0.5	112.5	27.7	406.8
Vegreville	6.2	5.4	0.7	69.4	27.6	251.4
Virden	7.0	5.6	1.4	76.1	36.9	206.3
Watrous	7.1	5.5	1.7	61.1	27.8	220.0
Weyburn	7.6	6.2	1.4	52.6	34.0	154.8
Winnipeg	7.7	5.6	2.0	63.5	37.3	170.5
Wynyard	6.4	4.7	1.6	71.9	26.8	268.4
Yorkton	6.3	5.0	1.3	39.4	31.3	125.9

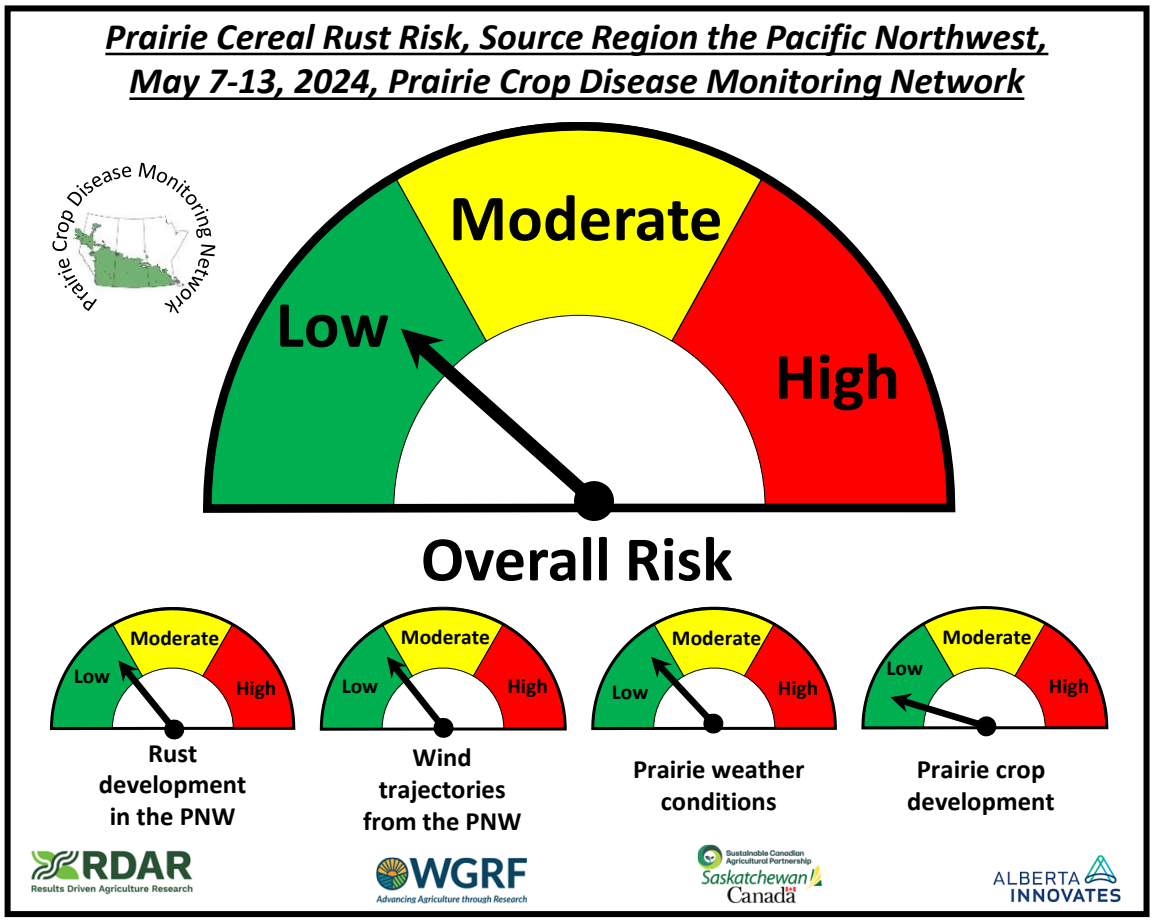

Figure 7. Prairie cereal risk speedometers for stripe rust from the Pacific Northwest, May 7-13, 2024.

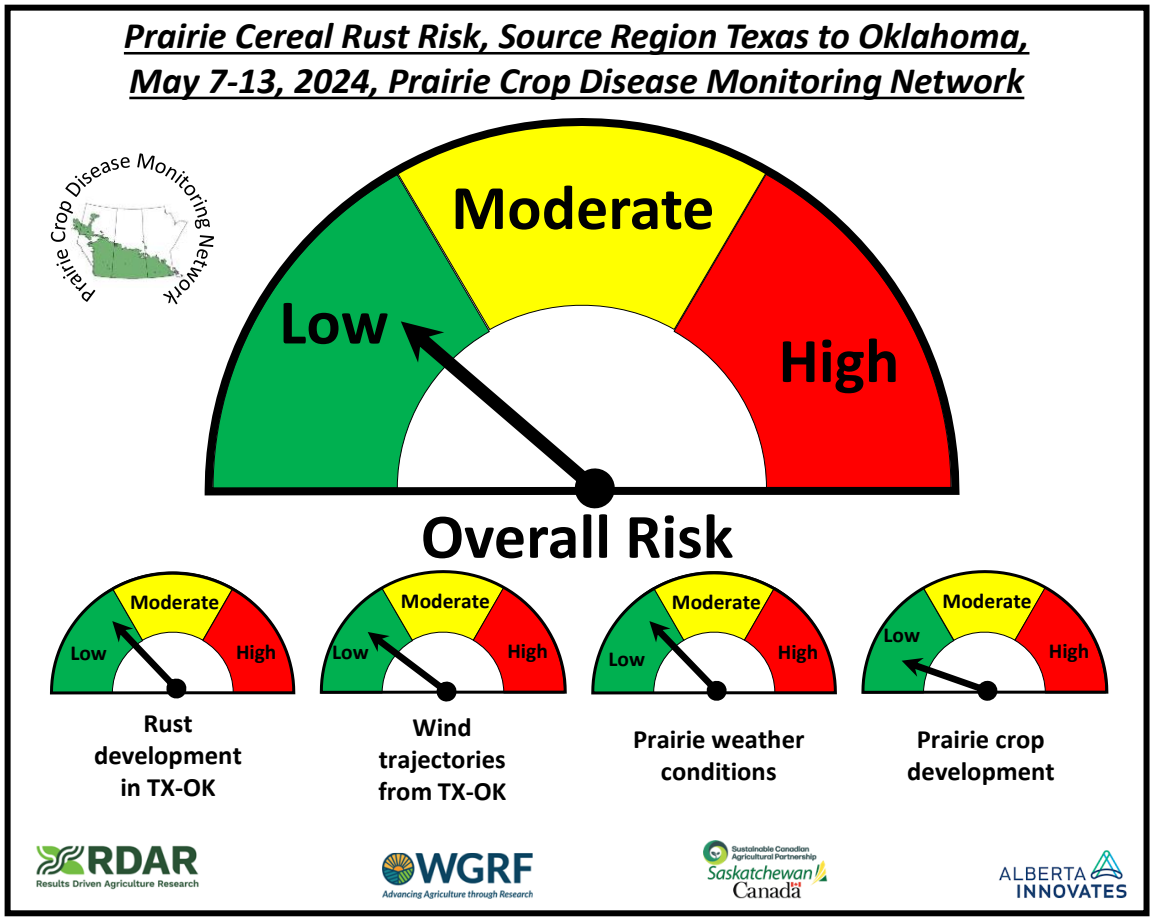

Figure. 8. Prairie cereal risk speedometers for stripe/leaf rust from the Texas to Oklahoma region, May 7-13, 2024.

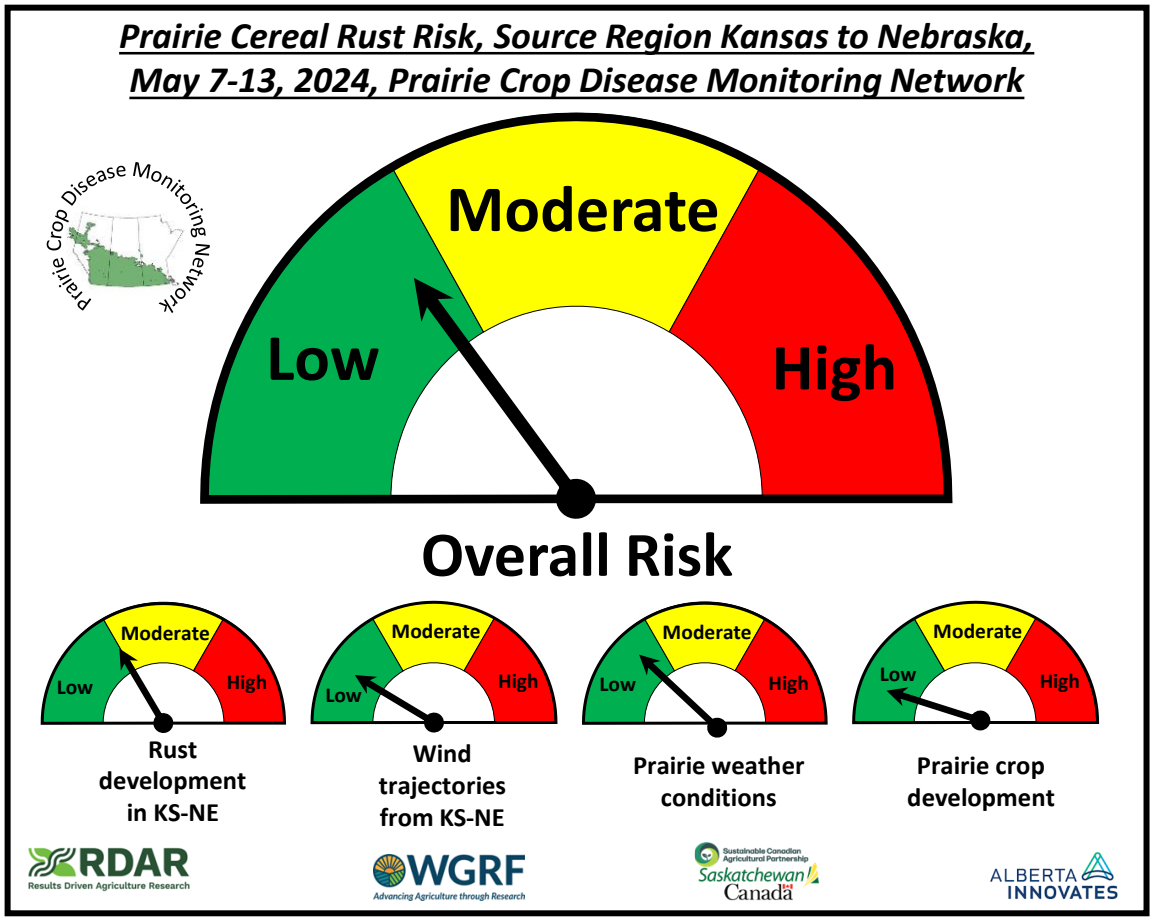

Figure. 9. Prairie cereal risk speedometers for stripe/leaf rust from the Kansas/Nebraska region, May 7-13, 2024.