# Update on *Metopolophium festucae cerealium*, a new aphid in the Pacific Northwest

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In 2011, as part of REACCH sampling efforts, we discovered an aphid species new to North America. A putative specimen was recorded in OR in 1995, but it had not been observed since then. In 2011, as part of our regionwide sampling efforts, we detected the aphid, *Metopolophium festucae cerealium* (MFC) (Figure 1), in large numbers at dozens of sites. MFC continues to be abundant throughout the REACCH region, based on our samples from 2014. Although its average numbers per sweep net sample have declined relative to 2013, MFC is still abundant, constituting more than half of all aphids sampled. On some of its host plants, MFC can cause reddish staining around feeding sites, a type of injury that most other aphids in our region do not cause (Figure 2). The aphid is difficult to identify because it looks similar to the rose grass aphid, which can also be abundant in our region. When both are in their winged form, MFC has broken bars on the abdomen, which are absent on the rose grass aphid. In the more common wingless forms, MFC antennae get darker from base to tip, while the antennae on rose grass aphids are pale with black joints.

**IMPACT**

The appearance of a new aphid in Pacific Northwest wheat systems merits study to determine whether it will require different approaches to its management than those used for existing aphids immediately and into the future. The work under way will achieve this objective.

MFC is evidently native to Great Britain, and little is known about its ecology and potential as a pest here in the Pacific Northwest (PNW). As part of REACCH, we have established a laboratory colony to allow us to conduct experiments to learn more about its biology. In a multiple-choice experiment, MFC aphids prefer to settle on wheat and avoid corn, but they also will settle on barley, oat, and several grasses native to the PNW (Figure 3a). When confined on these plants, MFC reproduction is high on wheat and barley, intermediate on oat and blue wild rye, and poor on Idaho fescue, rough fescue, and blue bunch wheatgrass. It is unable to survive or reproduce on corn (Figure 3b). When allowed to develop unchecked on wheat plants, MFC readily kills the plants, as do other aphids that commonly infest wheat in our region: bird cherry-oat aphid, rose grass aphid, Russian wheat aphid, and English grain aphid. Experiments are needed to compare direct injury among aphid species to see if MFC causes more injury than other aphids.

Whether MFC continues to be abundant in our region may depend upon responses of natural enemies. In extensive surveys conducted over four years, MFC constituted as much as 46% of all aphids captured (in 2012) but declined to just 9% in 2014 (Figure 4).

**Figure 1.** Metopolophium festucae cerealium, *a newly arrived aphid affecting wheat in the Pacific Northwest. Photo by Brad Stokes.*

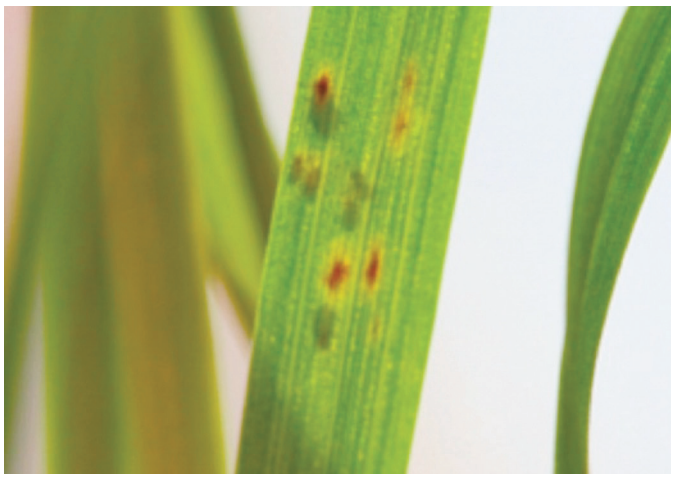
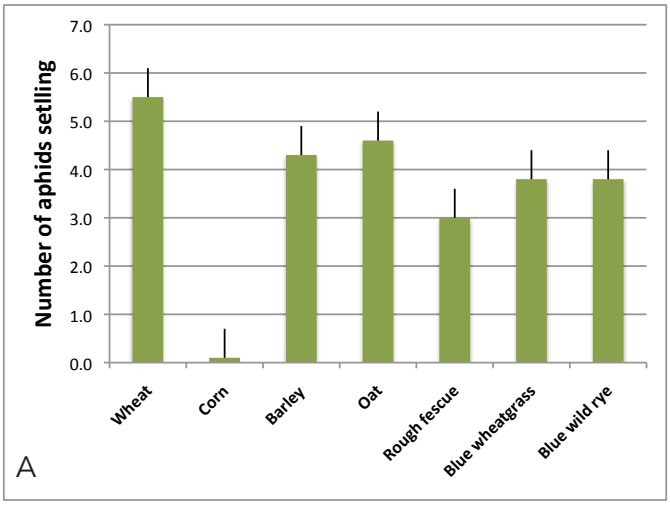


**Figure 2.** *Example of feeding injury caused by this aphid; on some hosts it can cause a red staining, as shown here. Photo by Brad Stokes.*

## MFC and climate change

Is the presence of MFC in our region attributable to our warming climate? Unfortunately, this cannot be determined, since many other causes are possible, including a recent introduction of an aggressive population of this species, or adaptation to PNW con-



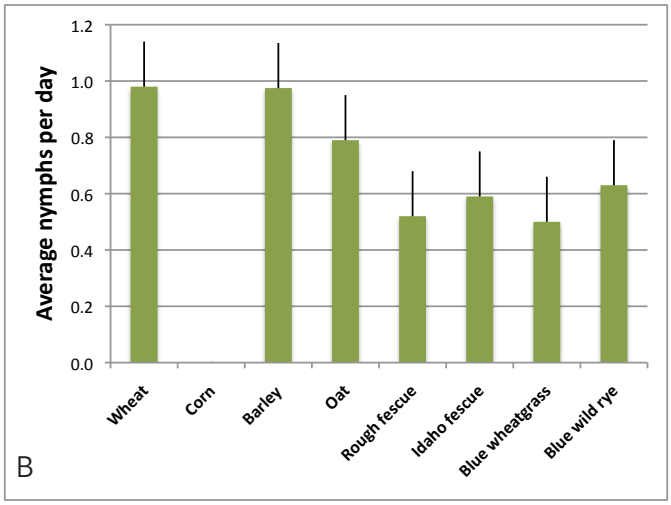




**Figure 3.** *Response of* Metopolophium festucae cerealium *to cultivated and native grasses of our region. (a) Number settling on each species when presented with all seven in a choice test. (b) Reproduction of the aphids when feeding on each of the grass species.*

ditions that have allowed it to become abundant. Nonetheless, we are investing resources in studying it, because it promises to be an important component of the pest complex in wheat during the future.

### Next steps

Some questions concerning MFC are important to address in a timely manner. Whether MFC causes more direct injury per aphid than that caused by other aphids has not been established. The discoloration it causes suggests that it might be more injurious. Field trials conducted to measure its effects on wheat this past summer were unsuccessful due to heavy infestations from other aphids that obscured the effects of MFC alone. The trials will be conducted again in 2015. If MFC causes more injury than other aphids, more aggressive treatment might be indicated. It is also extremely important to determine if MFC can act as a vector of Barley yellow dwarf virus. In preliminary experiments, results have been too inconclusive to report here. It will be important to measure its capacity as a vector using different virus sources, virus isolates, and host plants. That work is under way as part of REACCH. This summer and last, we reared MFC specimens to determine if they were being attacked by parasitic wasps (natural enemies); two species of wasps were found, but they are rare. Continued monitoring for natural enemies is merited. Finally, we are broadly interested in assessing how aphids respond to climatic stresses such as heat and drought and how MFC interacts with other species, and we are conducting experiments to address these questions.

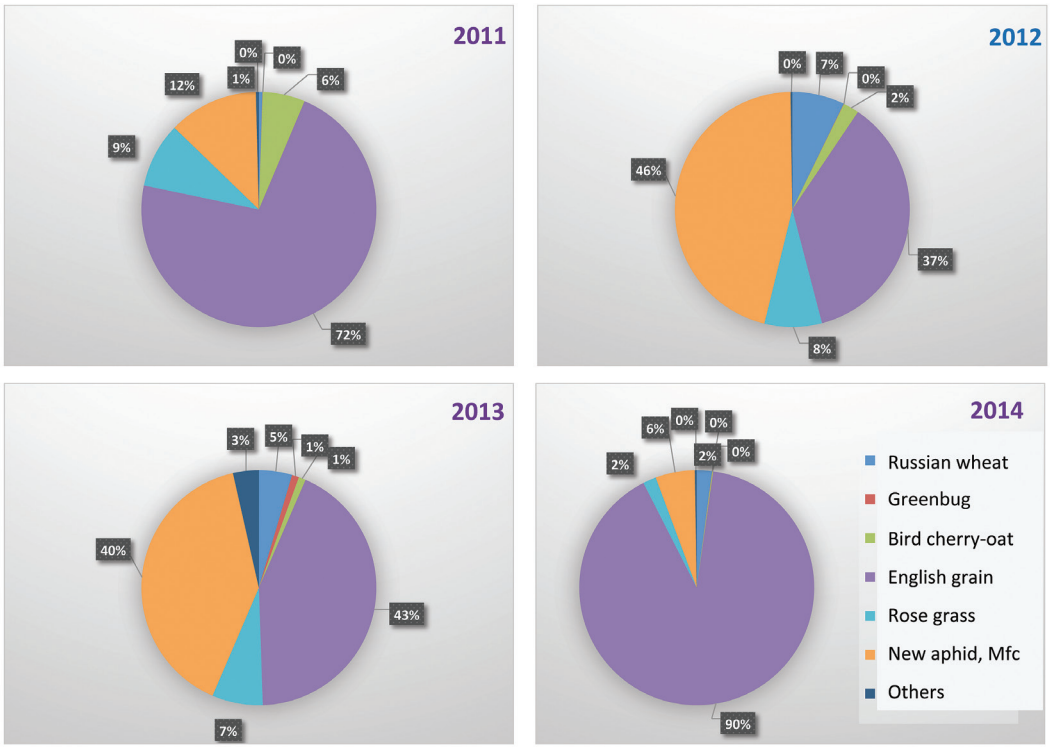



**Figure 4.** *Aphid community across the REACCH region, with percentages of individuals for each of the predominant species.* Metopolophium festucae cerealium *(MFC) was was most abundant in 2012 and second most abundant in 2013.*