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## ***Metopolophium festucae cerealium* (Hemiptera: Aphididae), a new addition to the aphid fauna of North America**

Susan E. Halbert

Florida Department of Agriculture and Consumer Services, Susan.Halbert@freshfromflorida.com

Ying Wu

University of Idaho, ywu@uidaho.edu

Sanford D. Eigenbrode

University of Idaho, sanforde@uidaho.edu

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Susan E. Halbert

Florida Department of Agriculture and Consumer Services  
Division of Plant Industry  
P.O. Box 147100  
Gainesville, FL 32614-7100

Ying Wu and Sanford D. Eigenbrode

Department of Plant, Soil and Entomological Sciences  
University of Idaho, Moscow, ID 83843

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Susan E. Halbert, Ying Wu and Sanford D. Eigenbrode  
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*Metopolophium festucae cerealium* (Hemiptera: Aphididae), a new addition to the aphid fauna of North America

Susan E. Halbert  
Florida Department of Agriculture and Consumer Services  
Division of Plant Industry  
P.O. Box 147100  
Gainesville, FL 32614-7100  
Susan.Halbert@freshfromflorida.com

Ying Wu and Sanford D. Eigenbrode  
Department of Plant, Soil and Entomological Sciences  
University of Idaho, Moscow, ID 83843  
yw@uidaho.edu; sanforde@uidaho.edu

**Abstract.** *Metopolophium festucae cerealium* (Stroyan) (Hemiptera: Aphididae) was found in wheat fields in the Pacific Northwest in 2011 and 2012. This is the first record of *M. f. cerealium* in North America. This subspecies can be a serious pest of cereal crops.

**Key Words.** *Metopolophium festucae cerealium*, cereal crops, wheat, cereal aphids

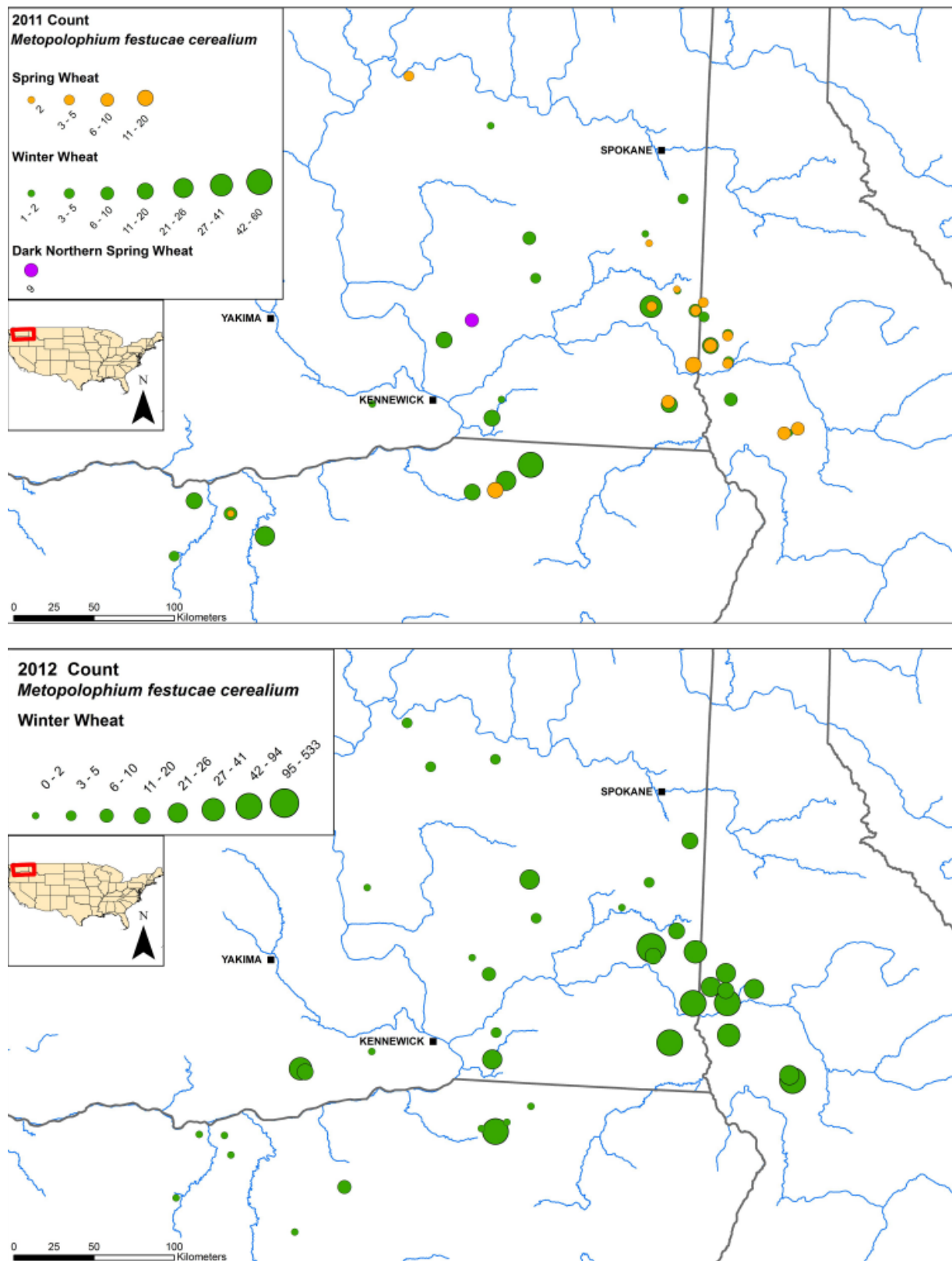
## Introduction

Stroyan (1982) separated the subspecies *Metopolophium festucae cerealium* Stroyan (Hemiptera: Aphididae) from *Metopolophium festucae* (Theobald, 1917), *sensu stricto*, based on morphological characters and host preferences. *Metopolophium festucae s.s.* feeds on a variety of grasses, but is only incidental on cereal crops, whereas *M. f. cerealium* is a significant pest of cereal crops. It also can be found on grasses.

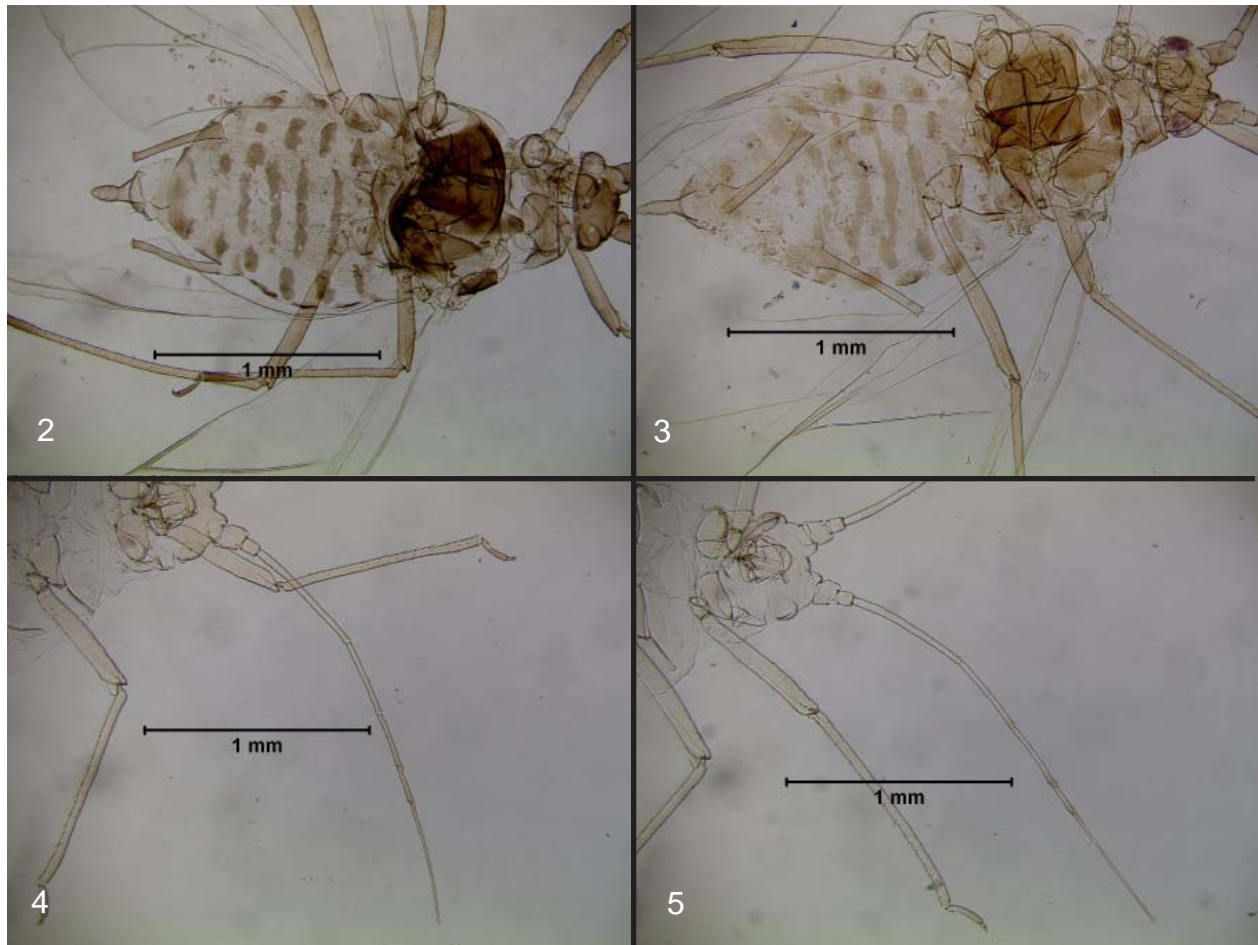
Plumb (1974) reported that *M. festucae* (presumably *M. festucae cerealium*) is more damaging to oats (*Avena sativa* L.) than to other cereals, causing damage similar to that reported for *Schizaphis graminum* (Rondani) in the USA. Dent and Wratten (1986) assessed host plant relationships of *M. festucae cerealium* among various pasture grasses and wheat (*Triticum aestivum* L.). They found that wheat was more susceptible than any of the grasses tested.

*Metopolophium festucae* was reported in the USA in California in 1970 (Foottit et al. 2006). It is not listed in the Idaho fauna (Gittins et al. 1976), but it is listed (subspecies unspecified) as occurring in the Pacific Northwest in Pike et al. (2003). In Idaho, *M. festucae* briefly became a pest in 1994 in Boise on fescue lawns. People who were encouraged to plant drought-tolerant fescue lawns inadvertently planted a monoculture of the favored host plant for this species. Moreover, the mild winter of 1993/1994 enabled this commonly anholocyclic species to overwinter easily in the Boise area. Populations in a few lawns reached hundreds per leaf; however, no colonization of cereal crops was observed. Measurements of the specimens were borderline between the two subspecies, but the dorsal pattern on the alatae appeared to match that of *M. festucae s.s.* (Fig. 2). Vouchers are deposited in the Florida State Collection of Arthropods (FSCA).

From the mid 1980s through the mid 1990s, cereal crops in the Pacific Northwest were surveyed extensively for aphids because of epidemics of barley yellow dwarf and because of the establishment of the Russian wheat aphid, *Diuraphis noxia* (Mordvilko) in the late 1980s. A few specimens that appeared to be *M. f. cerealium* were collected in suction traps in 1994 in Oregon at Corvallis, Madras, and Hermiston. No colonization of cereal crops was observed. The apparent specimens of *M. festucae cerealium* were reported informally (Halbert and Sandvol 1995), but follow-up with surveys on cereal crops was recommended to confirm the identity of the collections. Until now, this aphid has not been reported on cereal crops in the USA.



**Figure 1.** Maps showing locations and relative numbers of *Metopolophium festucae cerealium* Stroyan in samples collected in 2011 and 2012 in the Pacific Northwest. Map by Alicia Lawrence, FDACS/DPI.



**Figures 2-5.** **2)** Dorsum of *Metopolophium* sp., probably *festucae sensu stricto*. This aphid was collected from a fescue lawn in Boise Idaho. Note the lack of a rudimentary patch on abdominal segments V and VI (just anterior to siphunculi), and the curved, slightly darker siphunculi, as compared with *Metopolophium festucae cerealium*, Fig. 3. **3)** Dorsum of alate *Metopolophium festucae cerealium*. Note abdominal pattern, especially incomplete patch on segments V and VI (just anterior to the siphunculi). **4)** *Metopolophium festucae cerealium* antenna of apterous form. Note that joints are not darkened. **5)** *Metopolophium dirhodum* antenna of apterous form. Note dark joints on the antenna, especially on segments V and VI.

### Recent surveys and discussion of species

In June and July of 2011, another cereal aphid survey project was initiated that included sweep sampling of wheat fields in Washington, Oregon, and Idaho. Nearly every sample contained *M. festucae cerealium*. The aphids were found in both winter and spring wheat, and in all three states (Table 1). Voucher specimens from fifteen locations are deposited at the FSCA.

More samples were collected in 2012 (Table 2). Large numbers of *M. f. cerealium* were collected at some locations. (Fig. 1)

Only two species of *Metopolophium* occur on cereals in the Pacific Northwest. *Metopolophium dirhodum* (Walker) (rose grass aphid), another adventive species, has been in the USA at least since 1910 (Footitt et al. 2006). It is common and numerous in cereal crops, especially late season wheat (personal observations, S.E. Halbert). Separation of *M. festucae cerealium* from *M. dirhodum* is easier for alatae than for apterae. Alate *M. festucae cerealium* (Fig. 3) specimens have a pattern of broken bars on their abdomens, whereas alate *M. dirhodum* specimens do not have abdominal markings. Alate *M. festucae cerealium* on cereals might also be confused with alate *Sitobion avenae* (Fabricius), but specimens of *S. avenae* have

dark, reticulated siphunculi, whereas *Metopolophium* species have pale to dusky siphunculi without reticulation. Apterous *M. festucae cerealium* (Fig. 4) specimens have antennae that darken progressively from base to apex, whereas apterous *M. dirhodum* (Fig. 5) specimens have antennae with dark joints. Neither species has abdominal markings. Both species are easily separated from *S. avenae* apterae by their pale siphunculi and lack of abdominal markings.

Separation of *M. festucae s.s.* from *M. f. cerealium* requires discriminant functions (Stroyan 1982). Sometimes results are borderline. According to Stroyan, however, *M. festucae s.s.* is not found on cereal crops. Also according to Stroyan (1982), *M. f. cerealium* alatae have intersegmental markings forming an incomplete patch on abdominal segments V and VI (Fig. 3), whereas *M. festucae s.s.* alatae never have this feature (Fig. 1).

It is not known at this time whether *M. festucae cerealium* will prove to be a significant pest of cereal crops in North America. *Metopolophium festucae* is a recorded vector of one or more the barley yellow dwarf complex of cereal viruses (Jedlinski 1981; Plumb 1974). Blackman et al. (1990) suggested that these records should refer to *M. festucae cerealium*.

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**Table 1.** Sweep samples of *Metopolophium festucae cerealium* collected in wheat in 2011 in the Pacific Northwest. Asterisks (\*) indicate that at least one voucher sample was collected from that location. Vouchers are deposited in the Florida State Collection of Arthropods (FSCA).

| State       | County      | Municipality     | Crop          | Sample Date | Alatae | Apterae | Altitude |
|-------------|-------------|------------------|---------------|-------------|--------|---------|----------|
| Idaho       | Idaho       | Cottonwood       | Spring wheat  | 11-Jul-11   | 7      | 3       | 3717 ft  |
| Idaho       | Idaho       | Cottonwood       | Winter wheat  | 11-Jul-11   | 1      | 0       | 2225 ft  |
| Idaho       | Idaho       | Greencreek       | Spring wheat  | 11-Jul-11   | 6      | 2       | 3130 ft  |
| Idaho       | Idaho       | Greencreek       | Winter wheat  | 11-Jul-11   | 1      | 1       | 3129 ft  |
| *Idaho      | Latah       | Genesee          | Spring wheat  | 7-Jul-11    | 4      | 1       | 2600 ft  |
| Idaho       | Latah       | Genesee          | Spring wheat  | 15-Jul-11   | 4      | 4       | 2762 ft  |
| Idaho       | Latah       | Genesee          | Spring wheat  | 7-Jul-11    | 1      | 4       | 2218 ft  |
| Idaho       | Latah       | Genesee          | Winter wheat  | 7-Jul-11    | 2      | 2       | 2658 ft  |
| Idaho       | Latah       | Genesee          | Winter wheat  | 15-Jul-11   | 12     | 5       | 2762 ft  |
| Idaho       | Latah       | Genesee          | Winter wheat  | 7-Jul-11    | 2      | 1       | 2441 ft  |
| Idaho       | Latah       | Moscow           | Spring wheat  | 1-Jul-11    | 3      | 1       | 2677 ft  |
| *Idaho      | Latah       | Moscow           | Winter wheat  | 1-Jul-11    | 3      | 1       | 2682 ft  |
| Idaho       | Nez Perce   | Culdesac         | Winter wheat  | 11-Jul-11   | 1      | 9       | 2960 ft  |
| Oregon      | Gilliam     | Condon           | Winter wheat  | 10-Jun-11   | 5      | 18      | 3463 ft  |
| *Oregon     | Sherman     | Moro             | Spring wheat  | 10-Jun-11   | 2      | 0       | 1882 ft  |
| Oregon      | Sherman     | Moro             | Winter wheat  | 10-Jun-11   | 3      | 4       | 1882 ft  |
| Oregon      | Umatilla    | Adams            | Winter wheat  | 22-Jun-11   | 2      | 22      | 1574 ft  |
| Oregon      | Umatilla    | Milton-Freewater | Winter wheat  | 21-Jun-11   | 14     | 46      | 1683 ft  |
| Oregon      | Umatilla    | Pendleton        | Spring wheat  | 10-Jun-11   | 16     | 3       | 3470 ft  |
| Oregon      | Umatilla    | Pendleton        | Winter wheat  | 22-Jun-11   | 2      | 13      | 1454 ft  |
| *Oregon     | Umatilla    | Pendleton        | Winter wheat  | 10 Jun-11   | 2      | 3       | 3470 ft  |
| *Oregon     | Wasco       | Maupin           | Winter wheat  | 9-Jun-11    | 1      | 2       | 1660 ft  |
| *Oregon     | Wasco       | The Dalles       | Winter wheat  | 9-Jun-11    | 5      | 13      | 1063 ft  |
| *Washington | Adams       | Lind             | Winter wheat  | 17-Jun-11   | 4      | 4       | 1872 ft  |
| Washington  | Adams       | Ritzville        | Winter wheat  | 17-Jun-11   | 2      | 2       | 1737 ft  |
| Washington  | Asotin      | Asotin           | Spring wheat  | 5-Jul-11    | 3      | 5       | 2900 ft  |
| Washington  | Asotin      | Asotin           | Winter wheat  | 5-Jul-11    | 6      | 7       | 3017 ft  |
| Washington  | Benton      | Prosser          | Winter wheat  | 22-Jun-11   | 0      | 2       | 1207 ft  |
| Washington  | Douglas     | Bridgeport       | Spring wheat  | 16-Jun-11   | 0      | 3       | 2058 ft  |
| Washington  | Franklin    | Connell          | Dark Northern | 17-Jun-11   | 7      | 2       | 2342 ft  |
|             |             |                  | Spring wheat  |             |        |         |          |
| Washington  | Franklin    | Connell          | Winter wheat  | 17-Jun-11   | 1      | 16      | 2340 ft  |
| *Washington | Lincoln     | Wilbur           | Winter wheat  | 15-Jun-11   | 2      | 0       | 2136 ft  |
| *Washington | Spokane     | Fairfield        | Winter wheat  | 30-Jun-11   | 4      | 1       | 2558 ft  |
| *Washington | Walla Walla | Prescott         | Winter wheat  | 22-Jun-11   | 0      | 2       | 976 ft   |
| *Washington | Walla Walla | Touchet          | Winter wheat  | 21-Jun-11   | 4      | 10      | 973 ft   |
| Washington  | Whitman     | Almota           | Spring wheat  | 5-Jul-11    | 3      | 2       | 2369 ft  |
| Washington  | Whitman     | Almota           | Winter wheat  | 5-Jul-11    | 5      | 25      | 2353 ft  |
| Washington  | Whitman     | Colfax           | Spring wheat  | 30-Jun-11   | 0      | 2       | 2337 ft  |
| Washington  | Whitman     | Colfax           | Winter wheat  | 30-Jun-11   | 1      | 0       | 2379 ft  |
| *Washington | Whitman     | Pullman          | Spring wheat  | 14-Jul-11   | 1      | 3       | 2621 ft  |
| Washington  | Whitman     | Pullman          | Winter wheat  | 14-Jul-11   | 1      | 8       | 2629 ft  |
| Washington  | Whitman     | Rosalia          | Spring wheat  | 30-Jun-11   | 0      | 2       | 2316 ft  |
| Washington  | Whitman     | Rosalia          | Winter wheat  | 17-Jun-11   | 0      | 1       | 2102 ft  |
| *Washington | Whitman     | Uniontown        | Spring wheat  | 5-Jul-11    | 14     | 2       | 2806 ft  |
| Washington  | Whitman     | Uniontown        | Winter wheat  | 5-Jul-11    | 10     | 0       | 3012 ft  |



**Table 2.** Sweep samples of *Metopolophium festucae cerealium* collected in wheat in 2012 in the Pacific Northwest.

| State      | County      | Municipality     | Crop         | Sampling Date | Alatae | Apterae | Altitude |
|------------|-------------|------------------|--------------|---------------|--------|---------|----------|
| Idaho      | Idaho       | Cottonwood       | Winter wheat | 19-Jun-12     | 12     | 11      | 3393 ft  |
| Idaho      | Idaho       | Greencreek       | Winter wheat | 19-Jun-12     | 25     | 41      | 3295 ft  |
| Idaho      | Latah       | Genesee          | Winter wheat | 4-Jun-12      | 6      | 11      | 2760 ft  |
| Idaho      | Latah       | Genesee          | Winter wheat | 4-Jun-12      | 32     | 29      | 2484 ft  |
| Idaho      | Latah       | Genesee          | Winter wheat | 25-Jun-12     | 13     | 8       | 2655 ft  |
| Idaho      | Latah       | Genesee          | Winter wheat | 27-Jun-12     | 9      | 14      | 2762 ft  |
| Idaho      | Latah       | Kendrick         | Winter wheat | 25-Jun-12     | 10     | 15      | 2371 ft  |
| Idaho      | Latah       | Moscow           | Winter wheat | 6-Jun-12      | 1      | 1       | 1737 ft  |
| Idaho      | Nez Perce   | Culdesac         | Winter wheat | 19-Jun-12     | 11     | 26      | 2386 ft  |
| Oregon     | Gilliam     | Condon           | Winter wheat | 21-May-12     | 0      | 1       | 3143 ft  |
| Oregon     | Morrow      | Heppner          | Winter wheat | 15-Jun-12     | 1      | 6       | 2173 ft  |
| Oregon     | Sherman     | Moro             | Winter wheat | 22-May-12     | 0      | 1       | 1871 ft  |
| Oregon     | Sherman     | Wasco            | Winter wheat | 23-May-12     | 1      | 1       | 1235 ft  |
| Oregon     | Umatilla    | Adams            | Winter wheat | 11-May-12     | 0      | 2       | 1596 ft  |
| Oregon     | Umatilla    | Milton-Freewater | Winter wheat | 10-May-12     | 2      | 0       | 1683 ft  |
| Oregon     | Umatilla    | Pendleton        | Winter wheat | 11-May-12     | 0      | 1       | 1562 ft  |
| Oregon     | Umatilla    | Pendleton        | Winter wheat | 11-May-12     | 10     | 43      | 3470 ft  |
| Oregon     | Wasco       | Maupin           | Winter wheat | 21-May-12     | 0      | 1       | 1652 ft  |
| Oregon     | Wasco       | The Dalles       | Winter wheat | 21-May-12     | 0      | 1       | 898 ft   |
| Washington | Adams       | Lind             | Winter wheat | 30-May-12     | 17     | 8       | 1890 ft  |
| Washington | Adams       | Ritzville        | Winter wheat | 30-May-12     | 2      | 2       | 1724 ft  |
| Washington | Asotin      | Asotin           | Winter wheat | 31-May-12     | 45     | 49      | 2806 ft  |
| Washington | Benton      | Prosser          | Winter wheat | 23-May-12     | 1      | 0       | 934 ft   |
| Washington | Douglas     | Bridgeport       | Winter wheat | 5-Jun-12      | 0      | 4       | 2266 ft  |
| Washington | Franklin    | Connell          | Winter wheat | 16-May-12     | 0      | 8       | 1190 ft  |
| Washington | Franklin    | Connell          | Winter wheat | 16-May-12     | 0      | 1       | 1131 ft  |
| Washington | Grant       | Coulee City      | Winter wheat | 5-Jun-12      | 1      | 2       | 2324 ft  |
| Washington | Grant       | Quincy           | Winter wheat | 16-May-12     | 0      | 0       | 1200 ft  |
| Washington | Klickitat   | Bickleton        | Winter wheat | 14-Jun-12     | 8      | 23      | 2793 ft  |
| Washington | Klickitat   | Bickleton        | Winter wheat | 14-Jun-12     | 3      | 14      | 2576 ft  |
| Washington | Lincoln     | Wilbur           | Winter wheat | 5-Jun-12      | 1      | 2       | 2315 ft  |
| Washington | Spokane     | Fairfield        | Winter wheat | 25-Jun-12     | 10     | 7       | 2604 ft  |
| Washington | Walla Walla | Prescott         | Winter wheat | 10-May-12     | 1      | 2       | 1044 ft  |
| Washington | Walla Walla | Touchet          | Winter wheat | 10-May-12     | 4      | 22      | 973 ft   |
| Washington | Whitman     | Colfax           | Winter wheat | 11-Jun-12     | 17     | 3       | 2360 ft  |
| Washington | Whitman     | Almota           | Winter wheat | 22-Jun-12     | 116    | 417     | 2348 ft  |
| Washington | Whitman     | Palouse          | Winter wheat | 7-Jun-12      | 9      | 9       | 2199 ft  |
| Washington | Whitman     | Pullman          | Winter wheat | 22-Jun-12     | 15     | 26      | 2738 ft  |
| Washington | Whitman     | Rosalia          | Winter wheat | 7-Jun-12      | 0      | 3       | 2185 ft  |
| Washington | Whitman     | Uniontown        | Winter wheat | 13-Jun-12     | 21     | 41      | 2799 ft  |