

Section IV.

Biological and Cultural Controls

BIOLOGICAL CONTROL OF RUSSIAN WHEAT APHID IN SE WASHINGTON -USDA-APHIS REPORT

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89% of all USDA-APHIS biological control releases against the russian wheat aphid (RWA), *Diuraphis noxia* (Mordvilko), have been below 47 latitude, a line running from Ellensburg through Moses Lake to Colfax. The RWA is most common at economic levels along the Snake River corridor, and was first identified in Washington in 1987 in Garfield and Walla Walla Counties. Between 1989 and 1991, RWA infestations occurred north of latitude 47, and these infestations occurred later in the season than those of the southern hot spots. Populations were less uniform in 1991 compared to the previous 2-years. Releases of parasitoids and predators occurred throughout the RWA range of distribution from 1988 through 1992. 9 species of parasitoid totaling 260,000+ individuals and 10 species of predator totaling 175,000 individuals were released with the majority released in 1992.

During the 1992 growing season, economic populations of RWA occurred in northern Benton County and Kittitas County that were suitable for releases of biological control materials, and releases were made also in Garfield and Walla Walla Counties. Parasitoid activity increased notably in 1992 and many RWA populations remained below economic injury levels. Weather conditions favored biological controls as compared to the RWA. The winter of 1992-93 was mild with a substantial volunteer cereal green bridge.

In 1993, parasitism by microhymenoptera ranged from 10 to 100% of RWA infested tillers in SE Washington populations by early June. Due to RWA population being held below ca. 5% infested tillers in spring cereal fields, no APHIS releases were made against RWA in 1993. Again, cool, wet weather seemed to support parasitoid population growth as compared to RWA populations in 1993.

1994 was a different story with a cold dry spring followed by very warm dry weather beginning in mid-April. RWA populations became very high from March onward throughout eastern Washington, with an estimate by Dr. Keith Pike of 80,000 acres of spring cereals damaged by RWA in 1994. Information gathered by APHIS support this estimate of RWA damage. Parasitoid populations remained low until June and then were spotty compared to 1993. In some locations in Whitman and Garfield Counties, parasitoid levels as high as 80% occurred in isolated pockets of spring cereals late in the growing season. One release was made by APHIS against RWA in 1994. Widespread grasshopper infestations on adjacent rangeland and in CRP eliminated green bridges for biological controls as did extremely hot, dry weather though mid-October.

Recoveries of parasitoids by APHIS in SE Washington to date have been only the braconid wasp, Diaeretiella rapae. David Bragg recovered 3 specimens of another braconid, Aphidius colmani, in 1992 at Central Ferry in Garfield County. Aphidius colmani has been released only in Garfield and Walla Walla Counties, with 4,000 individuals over a 4-year period. Bragg has recovered substantial numbers of D. rapae in Garfield and Whitman Counties, where economic damage by RWA has been rare since 1991. D. rapae appears to be a dominant parasitoid of RWA, with levels of parasitism reaching 80% on spring cereals.

No released coccinellids have been recovered to date in the western United States. Bragg found 1 specimen of Scymnus fenderi Malkin at Central Ferry in 1992, a likely native species. Bragg recovered Leucopis near ninae in 1992 and 1993 at Central Ferry in Garfield County on mature barley populations of RWA at low levels. Ca. 75% of Leucopis were parasitized by Syrphophagus sp.

Future plans for RWA biological control by APHIS include structured releases and the use of emergence canisters for recoveries on land owned by the USA Corps Engineers in Garfield and Whitman Counties. Field insectaries will be established on sequentially seeded spring wheat on Corps land. Included are native grasses, CRP lands, other specific host crops propagated and maintained for RWA. APHIS will also continue to coordinate RWA biological control recovery surveys with David Bragg of Washington State University. Bragg will investigate pesticide impacts on biological controls of RWA through replicated field trials in 1995.

A handout is available from APHIS listing all biological control releases on Russian wheat aphid by species, numbers, countries of origin, and release sites by counties.