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## **Impacts of Ambient Temperature on IPM of Cereal Leaf Beetle and Russian Wheat Aphid in SE Washington State**

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*Hippodamia convergens* ( Coleoptera:Coccinellidae), Convergent Lady Bird Beetle, is a Native American Ladybird species that is the principle predator of early spring wheat pests including the Cereal Leaf Beetle (*Oulema melanoplus*) and the Russian Wheat Aphid (*Diuraphis noxia*).

Convergent ladybirds overwinter in sheltered habitats on the edge of forest ecosystems on Mountains and are often sold by the pound to home owners from California sources. These habitats have been identified by members of the Nez Perce' Tribe in the Blue Mountains of SE Washington and NE Oregon, and are being protected from development. Convergent ladybird beetles must have a prenuptial flight in the early spring from their overwintering site to some source of protein (aphids) in the dryland steppes where cereals are growing. After feeding for a time as adults the ladybird beetles mature eggs and fly to another host where eggs are laid and their life cycle is completed.

Convergent Ladybird Beetles do not reproduce in these prenuptial environments. But are voracious feeders on the eggs larvae of Cereal Leaf Beetle up to 40% of the population, and any aphids present up to 80%. The arrival of the Convergent Ladybird Beetle in spring grains can prevent pest build up to economic levels. Russian Wheat Aphid are rare now days, but can build up to economic levels in cold springs and cause major crop loss.

Crop Year 2007 was a "typical" spring with Ladybird Beetles feeding on the winter wheat generation of Cereal leaf Beetle larvae then transferring to developing spring grains to feed preventing pest buildup. Much colder temperatures in 2008 delayed Ladybird flight for nearly a month and inhibited searching efficiency in the predator parasitoid guild.

Cereal Leaf Beetle were prevented from economic losses in spring wheat and barley as the spring generation. However the summer adult generation of Cereal Leaf Beetle destroyed late seedings of cereal crops in 2008 plus grass germ plasm collections adjacent to the cereals. Convergent Ladybird had exmigrated from the ecosystem by this time.

Conclusion: the colder temperatures of 2008 delayed predator action by the Convergent Ladybird Beetle in late winter/early spring insect pest populations.