

PROJECT PROGRESS REPORT March 2006

TITLE: Which aphids are bringing barley yellow dwarf into Alabama wheat fields?

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OBJECTIVE:

Determine the identity of winged aphids that are carrying barley yellow dwarf into wheat.

JUSTIFICATION:

Barley yellow dwarf virus (and the related *Cereal yellow dwarf virus*) causes serious yield losses in wheat in Alabama. Previous studies have documented the impact of these viruses in Alabama. They have also shown that early planted wheat is more likely to have virus than later planted wheat, that different strains of the virus are prevalent in different years, and that foliar or seed-applied insecticides can reduce the spread of the disease. Certain weather conditions in the summer may also affect the amount of virus in the fall-planted wheat.

Each autumn, winged aphids fly into wheat fields. Some of these aphids are carrying barley yellow dwarf or cereal yellow dwarf virus from the summer hosts. The aphids feed on the wheat plants, and infect them with the viruses. Later in the season, aphids can spread the virus from these infected plants to other plants in the field.

We don't know which aphids are responsible for bringing the viruses into Alabama wheat fields each year. We need to know this in order to develop more effective management recommendations for aphids and barley yellow dwarf disease. There are several species of aphids that are found in Alabama wheat fields. Right now, we just count all aphids as equal when scouting for aphids. We could actually tolerate more aphids that don't typically carry barley yellow dwarf, and probably can tolerate fewer aphids that often bring in barley yellow dwarf. This is a fundamental weakness in our aphid action threshold.

Progress

In fall 2005, we made 8 collections of winged aphids from wheat fields in Tallassee and Headland (average 60 aphids per field per date). To see if they were carrying barley yellow dwarf virus, each aphid was placed on a susceptible virus-free oat seedling. Aphids were allowed to feed for 48 hours, to give them time to transmit the virus. The aphids were removed, and preserved so they can be identified. The plants are being grown out in the greenhouse to see if they develop symptoms of barley yellow dwarf virus. The first batch of plants will be evaluated for virus on 6 January (10 weeks after aphids were placed on them). Leaves from plants showing symptoms will be tested for virus using ELISA. The last collection of aphids was from wheat fields planted in late November. Oat plants inoculated at that time will not be ready to test for virus until February 20.

Our new graduate student, Mr. Buyung Hadi, arrived in early January. He will identify the aphids, and continue the virus testing, as part of his Ph.D. studies. Our plans are to request funding to repeat the study in fall 2006. We plan to expand the number of locations where aphids are collected.