

Addressing New Pest Developments in a Small Grain IPM System – 2014-2015

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The primary objects of the this 3 year program (2013-2016) are (1) Aphid management as it relates to both new thresholds and barley yellow dwarf virus (BYDV) management and (2) Weed management of newly emerging weeds and resistance management. Fusarium head blight monitoring and management has also been added to this project for the 2015 through 2017 seasons. .

(I) Weed Survey and Management Results – 2014- 2015

Please refer to document entitled “Weed Survey and Control of Key Weed Species in Small Grains” – authors: Mark Van Gessel, Extension Weed Specialist and Barbara Scott, Research Associate Weed Science

(II) Aphid Monitoring and Barley Yellow Dwarf Virus (BYDV) Surveys and Testing

One objective of this survey was to evaluate sampling techniques and new potential action thresholds developed in the south for managing aphids in small grains. A second objective was to identify fields with BYDV and critical plant stages for aphid control to reduce losses due to BYDV. There are four species of aphids that infest small grains in Delaware; bird cherry oat, English grain, corn leaf, and green bug aphid, all of which are capable of transmitting BYDV.

For the second year we surveyed thirty-one small grain fields on a weekly basis from mid-October to early December 2014 and again from March to April in 2015 to determine: (a) aphid species composition, and (b) abundance of aphids by examining one foot of row in ten random locations throughout each field and recording the number of aphids for each species. In the fall of 2014 and spring of 2015, these same fields were surveyed for BYDV symptoms. To better assess the potential impacts of BYDV on yield in 2015, fields were evaluated for symptoms of BYDV by assessing ten plants within a 5 foot radius in ten random spots throughout each field. Both symptomatic and asymptomatic samples were collected and sent to Agdia, Inc. to confirm the presence of BYDV.

Summary of Aphid Population Levels: Across all fields surveyed in 2014/2015, aphid populations in the fall and spring were again below the new thresholds being evaluated in this project. In 2014-2015, the predominant aphid species was the English grain aphid, followed by the bird cherry oat aphid and green bug aphid, detected in 84%, 68%, 35 % of the fields surveyed, respectively. In the first year of the survey, (2013/2014), the bird cherry oat aphid was the predominant species.

Summary of BYDV Screening: In both years of the fall survey (2013 and 2014), no BYDV virus symptoms were observed. In the spring of 2014, most of the samples

exhibiting potential virus symptoms were determined not to be potential candidates for BYDV screening; therefore, they were not sent off for analysis. Only samples from two fields were submitted to Agdia, Inc. in the spring of 2014 for virus screening. One of the samples was negative for all viruses, but tested positive for *Clavibacter michiganense tessellarius*, causal agent of bacterial mosaic in wheat. The second sample tested positive for BYD-PAV strain.

In the spring of 2015, both symptomatic and asymptomatic samples were collected. Although virus was observed in more fields in the spring of 2015 versus the spring of 2014, the incidence was still very low this season and was likely the result of vectoring by spring aphid populations. We suspect spring infections were the source due to a lack of early season symptoms, plant stunting, and patches of affected plants typical of early season infections. In some of the fields where no visual symptoms were observed and virus at low levels were confirmed, virus was at levels below the detection limit of our survey.

Although the incidence of BYDV was higher in the fields surveyed 2015 compared to 2014, the levels were still extremely low and no economic loss was reported from the levels of disease incidence in any of the surveyed fields. This survey will be conducted for one additional year (fall 2015 and spring 2016). At the end of the three year project we will be able to determine if BYD virus incidence is increasing in Delaware. In addition, it will also be used to refine decision making for aphid management as it relates to BYDV management.