

2007 Delaware ipmPIPE Sentinel Plot Survey for Soybean Rust, Soybean Aphid and Legume Viruses

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Sentinel Sites

Seven soybean sentinel plots were established throughout the state during early to mid-May (see attached map). These sentinel plots were part of the ipmPIPE and funded through USDA/APHIS/ RMA. The seven sites were the University of Delaware Experiment Station Farm in Newark, the New Castle county Extension Demonstration Farm near Middletown; the Delaware State University Smyrna Outreach and Research Center; a soybean variety testing plot near Felton, which was moved to another field near Harrington due to drought damage; RC Willin Farm, near Seaford; the University Carvel REC near Georgetown, and Murray Farms near Selbyville, DE.

Survey Activities

All sentinel plots were surveyed once per week or every two weeks as soon as the plants had produced leaves. In addition, 100 leaflets were taken from each sentinel site once per week once flowering began. These leaflets (700 total/week) were brought to the Plant Diagnostic Clinic at the University of Delaware where they were incubated for 3 days and examined under a microscope for soybean rust pustules. Surveying of all sentinel plots continued until the soybeans had matured and dropped their leaves. At that time, several full season commercial fields were replaced with late season, double-cropped soybeans to extend the survey season. This year's sentinel sites were planted with both a group III (SS RT3851N) as well as a later maturing Group V variety (SS RT5130N). A Syngenta Spore Tracker Station was also established at the Georgetown REC in the sentinel plot. Slides from that station were sent to the University of Arkansas weekly beginning in July. No soybean rust-like spores were detected in that spore trap. During September and October leaf samples were taken by personnel from the Delaware Department of Agriculture and this contribution is gratefully acknowledged.

Delaware Lab Detection Efforts for Soybean Rust

Asian soybean rust was not detected on soybean or any other host in Delaware in 2007. Leaf samples from sentinel plots in each county were collected over 15 weeks from July 2, 2007 to October 8, 2007. Five to seven sentinel plots were visited each week. Samples consisted of 100 leaflets taken from each plot in the lower canopy of plants. Leaves were incubated in plastic bags at room temperature for a minimum of three days, and then the underside of each leaf was examined under low power of a dissecting microscope. Growth stage was recorded as well as well as foliar diseases and insects present. Data was entered weekly into the ipmPIPE database and the NPDN database.

Early in the season, *Septoria* brown spot, downy mildew and thrips were common. As the weather became drier at the end of July, mites were very prevalent and fungal leaf diseases diminished. Aphids were first noted in the second week in August. Frogeye leaf spot and downy mildew were noted in September, following rain, but *Septoria* was consistently present all season.

Data observations were entered for 94 samples from sentinel plots, consisting of 9400 leaves. Twelve samples were received in the UD Plant Diagnostic Clinic with various symptoms and diagnoses, and soybean rust was not detected in any of those samples. The total number of soybean samples processed was 105 for 2007.

Soybean Aphid (SBA) Survey – 2007

The 2007 Soybean Aphid survey included both sentinel plots and commercial fields (repeated samples). Fields were visited on a weekly basis from early June through mid-August in 2007. Six sentinel plots and five-ten commercial fields were visited each week. When scouting for SBA, twenty plants were selected at random from each plot or field and examined for the presence of soybean aphids. In commercial fields Data collected included plant growth stage and the number of aphids per plant. When populations were at or below 250 aphids per plant, the number per plant was counted. When populations were above 250 per plant, aphid numbers were estimated and categorized as follows: (a) 250-499 per plant; or (b) 500 or more per plant. Data was entered weekly into the IPM PIPE database.

Soybean aphids were first detected during the first week in August in New Castle County. Populations were extremely low due to the extremely dry summer weather conditions. Economic levels were not detected in any of the survey sites. Statewide, approximately one percent of the soybean acreage was sprayed for soybean aphid, primarily as a part of the complex of insect pests present in soybeans. Results of the survey were used to convey information in newsletters regarding soybean aphid populations affecting approximately 60 % of the statewide soybean acreage.

Legume PIPE Survey

In addition to the soybean rust efforts the ipmPIPE was expanded to include virus detection in soybeans that included 2 sentinel plot sites. Leaf samples for virus detection were taken twice during the growing season. In addition five legume (non-soybean) sentinel plots were identified for disease monitoring during the growing season. One of the objectives was to survey these five legume plots for the occurrence of virus diseases.

Five total plots were established statewide: two in Kent and Sussex County, two of snapbean and two of lima bean. One lima bean plot was planted in New Castle County on the Newark Experimental Station Farm in Newark. Several samples were taken from various legumes at the end of the season that were exhibiting virus-like symptoms and included in the survey. The methodology was a new variation of the ELISA tests that have been commonly used for virus detection. The Tissue Blot Immunosassay (TBIA) for viruses on legumes (soybean and other beans) in 2007 was a modified method piloted (Va Tech & Agdia) to test samples directly from the field. It used a test card containing a nitrocellulose membrane and data recording fields. Solutions of antibody, enzyme conjugates, substrate, and buffer solutions were supplied, along

with trays for processing. Each card was used to test for two viruses (bean pod mottle (BPMV) and soybean mosaic (SMV), or bean yellows mosaic (BYMV) and cucumber mosaic (CMV)) depending on host. At each location sampled, leaves were taken at random from 45 plants at early flowering and again at mid-pod. Leaves were blotted onto the membranes after returning to the lab. Each membrane was processed through all solutions and incubation times, then dried and evaluated visually using magnification.

Results from soybean plots from Kent and Sussex in June and August did not indicate either bean pod mottle virus (BPMV) or soybean mosaic virus (SMV) present. However, soybean leaves from two fields in Kent County, Delaware in October, with obvious symptoms of mosaic and mottle, did test positive for BPMV. **This was the first confirmed report of BPMV in Delaware.** Snap bean and lima bean in Sussex County did not test positive for either bean yellows mosaic virus (BYMV) or cucumber mosaic virus (CMV) at either sample time in August or September. Snap bean in Kent County showed a slight positive color reaction at the second sampling for BYMV and CMV on Sept 21, 2007. Lima bean in New Castle and Kent counties had a slight positive reaction for BYMV and CMV in September, and a strong reaction from the New Castle plot in October for both viruses. The Kent County lima bean plot was not sampled a second time. Late in the season, symptomatic pole lima from the DSU farm in Kent and scarlet runner bean on the Newark, DE farm in New Castle county were sampled. The scarlet runner bean had a strong reaction to both BYMV and CMV, while a faint reaction to BYMV was noted in only one leaf from the DSU pole limas. Results indicate that virus was present in legume fields in Delaware in September and October, and timing of sampling in subsequent years should be adjusted.

2007 Soybean Sentinel Plots

