

COOPERATIVE FOREST HEALTH PROTECTION PROGRAM

2008 YEAR-END REPORT

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PLEASE NOTE: *With the exception of the emerald ash borer (EAB) trap tree program, observations and data presented in this summary are not to be considered to be comprehensive nor all inclusive studies. The narrative reported here is based on visual and observational surveys of Dr. Fredric Miller, Project Manager, interviews with consultants and members of the green and forest industries, field ecologists, and plant diagnostic records provided by The Morton Arboretum and University of Illinois Plant Diagnostic Clinics.*

EMERALD ASH BORER (EAB) TRAP TREE MONITORING PROGRAM

With the recent (2006) find of emerald ash borer (EAB) in northeastern Illinois and subsequent finds throughout the greater Chicago metropolitan area, and as far south as Bloomington/Chenoa, Illinois area, prudence strongly suggests that EAB monitoring is needed for the extensive ash containing forested areas associated with Illinois state parks, U.S. Army Corps of Engineers (USACE) lands, and the Shawnee National Forest (SNF).

Beginning in early July, 2008 trap trees were established at USACE lands at Carlyle, Renwick, and Shelbyville Lakes, Hazlet, Murphysboro, and Giant City state parks, and at the Garden of the Gods and Lake Glendale recreational use areas in the SNF. EAB trap trees were established using the USFS EAB trap tree guidelines. Where possible, trees in full sun were selected and at or near sites where EAB would most likely appear (i.e. campgrounds due to importation of firewood). In addition, we made every effort to select smaller trees (<5 inch DBH) to minimize the potential for hazard/liability and aesthetics, and to facilitate subsequent removal, peeling, and handling. A total of 133 trap trees were established at the above sites. Refer to Table 1 for a summary of trap tree locations, species composition, size class, and overall tree condition.

Due to the rather late start of selecting and establishing the above trap trees, we elected to leave all of the trap trees in place until fall, 2009 at which time they will be removed, peeled, and examined for evidence of EAB life stages and galleries.

DETECTION, IDENTIFICATION, AND EVALUATION OF DAMAGE-CAUSING AGENTS

ABIOTIC FACTORS

FLOODING: One of the earliest abiotic events to occur in various parts of Illinois, including areas contiguous to the Mississippi River in western and southwestern Illinois, and portions of southeastern Illinois, was the early summer (May-June) flooding.

Portions of the Quad Cities were once again flooded including downtown Davenport, Iowa scene of the infamous 1993 Mississippi River flood event. Communities farther south adjoining the Mississippi River also flooded including portions of St. Louis, Missouri.

In the Chicago metro area, the Des Plaines River drainage experienced flooding affecting the urban forests and wooded areas of the Cook County Forest Preserve District. Twice more, these same areas were flooded or threatened with flooding in mid September, 2008 with heavy rains and again in late December, 2008 when warm temperatures (50°F) and heavy rains facilitated a rapid snow melt of nearly 12 inches along with one to three inch rain events in just several days.

Additional areas of northern Illinois experienced a short term flood event in mid September, 2008 including the Rock, Fox, and Des Plaines River drainages.

Moving south, in southeastern Illinois, areas of the Wabash River watershed approximately east of I-57 and between I-70 to the north and I-64 to the south went out of their banks in early June, 2008 flooding low-lying areas.

Visual surveys of all of the above areas during July-September, 2008 did not reveal any obvious or extensive tree mortality. Tree survival was consistent with previous studies on short term flood events. Most of the tree species in these areas were bottomland species and were adapted to periodic flooding.

Based on my own personal experience and field research associated with the 1993 Mississippi River flood event, certain woody plant species will begin showing dieback and mortality symptoms within just a few weeks of the inundation (i.e. evergreens, flowering fruit trees, lindens, sugar maples and some oaks). Flood tolerant species may not show stress or decline symptoms for a number of years after flooding. In addition, my research and others have shown that the time of the year, duration of the flood, and current flow rate also are major variables affecting potential woody plant decline and mortality.

Adding to the flooding stress component, many parts of northern Illinois experienced dry to droughty conditions from approximately mid July through early September, 2008 prior to the very intense heavy rainfall event in mid September, 2008. Follow up surveys will be needed in

all of these areas in 2009 to determine the long term effects of the 2008 flood and drought events.

URBAN AND FOREST TREE INSECT PESTS

BAGWORM (BW): For approximately the last decade, bagworm has continued to increase in severity and range in northern Illinois. Prior to the late 1990's, bagworm populations were very spotty and sporadic particularly north of I-80 with a few infestations in the City of Chicago. With the onset of milder winters, bagworm populations have been increasing throughout northern Illinois especially in many of the urban forests of the western and northwestern suburbs. Short term droughts in 2005, 2007, and the aforementioned dry spell of 2008 have all exacerbated defoliation by the bagworm. Major species affected include Colorado blue spruce, common arborvitae, honeylocust, linden, hackberry, and bald cypress. For the past several years heavy to severe defoliation (50-75% of tree canopy) has been observed on the aforementioned species with honeylocust suffering the highest rate of mid to late summer defoliation.

A very preliminary research study is currently being conducted to determine the effect of overwintering cold conditions on the survivability of bagworm eggs. Initial lab studies have shown that bagworm eggs have the capacity to supercool to the mid -20°F. Field studies are also being conducted from 2006-present by periodically sampling bagworms from the field, subjecting them to defined periods (weeks) of prolonged cold in a freezer, and then allowing them to hatch in order to assess the effect of ambient winter temperatures on overwintering egg survival. Research by Miller and Hart (1987) and others found that the degree of cold and the duration are two major factors that effect the overwintering survival of insects in temperate climates. To date, the winters for the past several years (2006-present) have not been severe enough to have a major impact on overwintering bagworm egg survival. Further studies are needed to better identify the lethal supercooling point, production of cryoprotectants, and to quantify the effect of prolonged/cumulative cold temperatures on egg survival.

JAPANESE BEETLE (JB): The Japanese beetle (JB) is a well known and established invasive pest affecting over 300 different herbaceous and woody plant species including soybeans. Based on visual surveys conducted throughout Illinois, JB populations were very extensive and heavy in 2008.

In rural and agricultural landscapes, JB defoliation was very evident on linden, roses, wild and domestic grape, hawthorn, maples, and birch just to name a few. Defoliation at these sites ranged from 50 to 80% of the plant canopies.

In urban areas, JB defoliation was also extensive, but not quite as high as in rural areas. This may be partly due to the homeowners and landscape managers attempting to control adult JB's with the use of insecticides. In any event, many urban forest trees did show moderate to heavy defoliation (40-60%) In my 20 years of monitoring woody plant insect pests, I would say that 2008 was one of the heaviest years for JB defoliation (1).

FALL WEBWORM (FW): Fall webworm is a very common pest throughout the Midwest and mid-south. In the more southern realms there are two generations. In northern Illinois, only one generation of FWW occurs. Visual field surveys throughout the state for FWW webs and larvae

revealed typical (low to moderate) levels of FWW. Population levels increased gradually from northern to southern Illinois consistent with the bivoltine nature of the insect farther south. As with JB, FWW feeds on hundreds of different tree species and was found on a multitude of hosts including, but not limited to persimmon, black walnut, crabapple and common apple, maple, linden, and ash. No obvious tree decline or mortality was observed on forest trees species, however, trees growing in the central and southern portions of Illinois may be more prone to stress due to FWW feeding throughout the season. Trees growing in northern Illinois usually do not suffer as much from late season FWW defoliation since the trees are approaching senescence. Usually aesthetic issues associated with the webs are more common.

BARK BEETLES (BB) and WOOD-BORERS (WB): Bark beetles attack primarily stressed trees including both hardwoods and conifers. Prolonged drought or a variety of abiotic and biotic stresses may pre-dispose trees to bark beetle attacks.

Based on field observations and in conversations with green industry members and foresters, 2008 appeared to a “normal year” for bark beetle activity. No major bark beetle outbreaks were observed or reported for 2008.

Preliminary results from a research study on associates of the emerald ash borer (EAB) is revealing that the ash bark beetle and the ash privet borer are very common in declining ash trees being removed due to EAB and/or poor condition. Both of these insects are considered secondary agents coming in on stressed trees. This is not surprising as large portions of Illinois experienced droughts in 2005, 2007, and 2008. Many of these trees are just now beginning to show the effects of these abiotic events.

In addition, engraver beetles and the Zimmerman pine moth continue to be chronic problems for many of our common urban forest conifer species particularly Scots, Austrian pine, and mugho pines. As above, both of these insect pests tend to attack stressed conifers growing on poor sites (poor drainage) along with drought stress, soil compaction, construction damage, etc.

URBAN AND FOREST TREE DISEASES

DUTCH ELM DISEASE (DED): This vascular wilt disease has been in with us for decades and continues to kill American elms throughout Illinois. Based on reports provided by the University of Illinois Plant Clinic (UIPC), DED cases continue to be a problem and were more prevalent in 2008. These results are consistent with levels from 2003-2007 (3).

OAK WILT (OW): The dreaded oak wilt continues to spread in Illinois and has become both an urban and forest disease. Results reported by the UIPC indicated that there was no significant increase in positive oak wilt samples for 2008. A total of 45 samples were tested with 12 positive for OW. Based on data taken by the UIPC, 2002 was the highest year (104) for number of OW samples tested and 2008 the lowest (45). In most years, the number of samples tested ranged from 50 to 70 samples and 10-20% testing positive for OW (1,3)

VERTICILLIUM WILT (VW): This very ubiquitous and opportunistic vascular wilt fungus was very prevalent due to the very wet 2008. Trees stressed from the 2005, 2007, and 2008 droughts and the 2008 flooding are particularly susceptible to VW. Positive isolations of VW

were found in sugar maple, red maple, ash, smoketree, Japanese maple, and three-flowered maple. Counties with positive VW isolations included Champaign, Douglas, DeKalb, DuPage, Ford, Hamilton, Lake, Peoria, and Winnebago (3).

BACTERIAL LEAF SCORCH (BLS): Bacterial leaf scorch resembles abiotic scorch, but is caused by a bacterium, *Xylella fastidiosa*. It is thought to be spread by leafhoppers and spittlebugs. Tree hosts include elm, hackberry, maple, mulberry, oak, sweetgum, sycamore, and planetree. Since 1999, the UIPC records show that BLS has tested positive in 10 Illinois counties stretching from Jefferson, Madison, and St. Clair counties in southern Illinois through parts of central Illinois (i.e. Sangamon, Champaign, Douglas-Moultrie, Iroquois) north to Cook and DuPage counties and to far JoDaviess county in extreme northwest Illinois (3). With the exception of Champaign county with 40 positive samples, the remaining 9 counties have had 1-3 positive cases confirmed (3). In terms of hosts, BLS has been found in bur, northern red, pin, white, swamp white, and shingle oaks from 1999-2008. In 2008, BLS was found in seven (7) oak positives including northern red, swamp white, pin and several unidentified oak species (3).

ANTHRACNOSE DISEASES: As was pointed out above, May and June, 2008 were cool and wet. This provides an ideal environment for many common fungal leaf diseases including apple scab and anthracnose. Apple scab was extremely common on common apple species and crabapple varieties. Many of the older variety crabapples were completely defoliated by the end of summer. Commonly, sycamores were very slow to leaf out. Most sycamores did not have a full canopy until late June or early July. While not life-threatening, these diseases can reduce the photosynthetic capacity of trees leading to a reduction in food production, promote premature leaf drop, and pre-dispose trees to secondary agents mentioned above. (3)

NEEDLE CAST DISEASES: Two very common diseases affecting conifers, *Rhizosphaera* needle cast and *Diplodia* were prevalent in 2008. Both of these fungal leaf diseases attack the needles of cone-bearing tree species causing premature needle cast or a browning and/or death of the growing tip, respectively. While not outright fatal, they stress the tree as pointed out above and reduce overall ornamental qualities and growth rates of affected trees. Coupled with regular drought conditions, as mentioned previously, a deadly combination may result. (1,3)

STRESS-RELATED CANKER DISEASES: *Cytospora* canker of spruce is definitely a stress related disease particularly of Colorado blue spruce. Spruces are a common urban forest and landscape species. The cankers are initially found on the undersides of the branches and result from some type of stress. Spruce trees growing in urban environments are very prone to this canker. While not fatal, the cankers cause branches to die distal to the canker resulting in a loss of ornamental quality and landscape function. (1,3)

REFERENCES

1. Danielson, D. 2008. The Morton Arboretum Diagnostic Plant Clinic and Plant Health Care (PHC) Reports. The Morton Arboretum, Lisle, Illinois.
2. Miller, F. and E.R. Hart. (1987). Overwintering survivorship of pupae of the mimosa webworm, *Homadaula anisocentra* (Lepidoptera: Plutellidae), in an urban landscape. Ecological Entomology 12: 41-50.

3. Pataky, N. 2008. Woody Plant Disease Update for 2008. University of Illinois Plant Clinic (UIPC). Urbana, Illinois.

Table 1. Summary of EAB trap trees on USCAE lands, selected Illinois State Parks, and the Shawnee National Forest (SNF) (July, 2008).

LOCATION	# TREES	SPECIES	DBH	CONDITION
<i>U.S. ARMY CORPS OF ENGINEERS LAND</i>				
• Lake Shelbyville	70	31% white ash 69% green ash	<5 inches	No dieback
• Lake Caryle	17	100% green ash	<5 inches	24% with dieback
• Lake Rend	18	22% white ash	<5 inches	11% with dieback
<i>ILLINOIS STATE PARKS</i>				
• Hazlet S.P.	4	100% green ash	<5 inches	No dieback
• Murphysboro S.P.	2	100% green ash	<5 inches	No dieback
• Giant City S.P.	8	25% white ash	<5 inches	No dieback
<i>SHAWNEE NATIONAL FOREST</i>				
• Garden of Gods	6	100% green	<5 inches	No dieback
• Lake Glendale	8	87% white ash 13% green ash	<5 inches	No dieback