IOWA'S FOREST HEALTH REPORT, 2005

By: Aron Flickinger, Forest Health Coordinator, Bureau of Forestry

Each year, the Iowa DNR, Bureau of Forestry operates programs to protect forests from insects, diseases and other stressors. These programs involve ground and aerial surveys, transects, traps, laboratory analysis and treatments during the growing season. After each growing season, the Bureau issues a summary report regarding the health of Iowa's forests.

This year's report begins with a brief summary of weather events followed by aerial survey results, a description of the size and character of Iowa forests, Gypsy Moth survey, Sudden Oak Death survey, Emerald Ash Borer survey. The report finishes up by describing forest insects and diseases already present, and concludes with invasive plant species.

Weather

Low temperatures across Iowa on May 2-4 were colder than what the low temperatures reached for most of April throughout the state. The fast warm up of air and ground temperatures starting at the end of March and throughout April, set the stage for late season frost injury to many tree species throughout Iowa.

District foresters with the Iowa DNR noted varying degrees of damage to tree leaves across Iowa. Trees that were reported to be most affected by the frost were; ash, black walnut, hackberry, mulberry, and oaks. A reason for the difference in damage from one tree species to another is the trees with the least amount of damage were further along in their leaf development, which tended to be silver maple, elm, willow, alder and cottonwood. More trees were affected by the chilly weather in northern Iowa as compared to southern Iowa. In central and southern Iowa the damage was more likely to occur in low lying areas.

As a result trees in northeast Iowa produced less seed this fall because so many of their flowers were killed by the frost. The good news is the frost damaged trees recovered from the late frost damage by opening their lateral buds allowing them to produce the normal green leaves we are use to seeing.

Weather

Northwest and north central Iowa experienced flooding in June from an abundance of rainfall. Stress on trees in Iowa in the form of dry conditions persisted throughout the state starting in July through November with southern and east central Iowa being the farthest behind in normal precipitation.

Aerial Survey

Iowa forests surveyed by plane in 2005 were found to be in generally good condition. On July 5th the surveying crew started above Humbolt and flew south following the Des Moines River until it met up with the Mississippi River. From there the crew followed the Mississippi River north to Toolesboro, where they then followed the Iowa River back to Marshalltown. Observance along this route showed lots of flooding from overfilled rivers. Silver maple and cottonwood trees showed chlorotic symptoms in their leaves from their water saturated soils. Most counties along the route also showed signs of Dutch elm disease (DED).

On July 6th the same crew started above Waterloo and followed the Cedar River to the south until reaching the Mississippi River where they turned north following the Mississippi River back up to the northeastern most corner of Iowa. The crew flew back to where the Upper Iowa enters the Mississippi and followed this river to the west. This day's route showed the most oak wilt/ oak decline, especially in Dubuque, Clayton, Jackson, Johnson and Allamakee counties. The most DED was also noted along this route with the counties with the greatest occurrence being Black Hawk, Louisa, Clinton, Buchanan, Dubuque and Muscatine.

A summary of all forest health activity detected during the aerial flight survey and the number of acres of damage estimated in Iowa for 2005 can be found in Table 1 at the end of this report.

THE SIZE AND CHARACTER OF IOWA'S FORESTED LAND

The positive news regarding Iowa's forests is that they are generally healthy and are increasing in number of acres. Forest's help achieve clean water, wildlife and economic goals in Iowa. Iowa's forests are increasing in average tree quality and average tree size. Most Iowa forests are native hardwood forests with oak, hickory, maple, basswood, walnut, ash, elm, cottonwood and many other hardwood species. Less than 3% of Iowa forests are conifer forests.

A positive forest fact is that Iowa now has approximately 2.7 million acres of forested land representing a steady increase over the past few decades. Forest conservation programs, reforestation programs and shifts in agricultural land use all contributed to an increase in forested acres.

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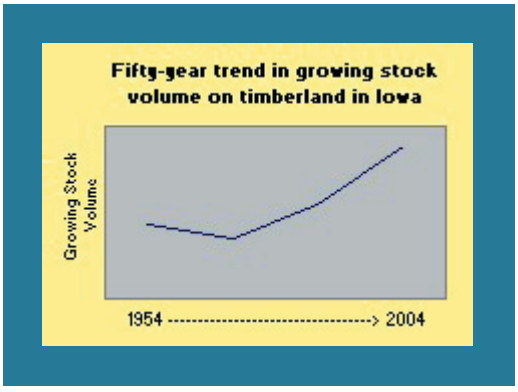
A noteworthy statistic is that the amount of growing stock in Iowa forests is increasing. "Growing stock" is a measure of percent of sound (as opposed to cull) trees.



Oak is one of Iowa's most abundant hardwood species, but oak is decreasing in acreage in some areas as forest succession drifts toward more shade-tolerant species such as maple in the absence of forest disturbance. Foresters are using silvicultural systems to counter this trend to regenerate oak.

A forest resource that is expanding and sustainable promotes economic strength in Iowa. A forest resource that is healthy contributes immensely to our state's goals of clean water, abundant wildlife habitat, lumber and veneer production, outdoor recreation and aesthetics that enhances quality of life in Iowa.

Walnut a valuable in Iowa hardwood species.

Even though Iowa's forests are generally healthy and are contributing to the above amenities, certain stressors can threaten our forests and those stressors are discussed here in more detail.

GYPSY MOTH:

Gypsy Moth is a European insect species introduced into New England over 100 years ago as an experiment to help provide silk for the textile industry. This exotic insect continues to spread west from that introduction site and defoliate native forests wherever they become established. Establishment of gypsy moth in Iowa will affect the survival of our mature and oldest oak trees the most. The larvae of this insect will feed on the leaves of its host species during the summer removing a trees ability to create food with its leaves. If this defoliation occurs several years in a row on the same trees it will deplete the stored reservoirs of nutrients the tree has over time, thus making it more susceptible to other pests in the area and stressful weather conditions.

GYPSY MOTH: Background Information

Gypsy Moth has established itself in certain areas of Wisconsin now, and is just beginning to move towards northeast Iowa. Through Iowa's trapping program and follow up treatments, Gypsy Moth has been kept out of Iowa, but there are now 5 counties (Allamakee, Clayton, Dubuque, Jackson, Clinton) within 60 miles of the gypsy moth establishment boundary line. Furthermore, Wisconsin is reporting that the gypsy moth population is building in neighboring Adams, Columbia, Dane, Marathon and Sauk counties.

Some good news is that 2005 saw a decrease in Gypsy Moth trap catches, both in Wisconsin and Iowa. Weather patterns along with an introduced fungus disease for gypsy moth called entomophaga maimaiga and other natural factors combined to slow the spread of gypsy moth this year. Only 4 moths were caught, down from 27 moths in 2004.

The Iowa Department of Agriculture and Land Stewardship (IDALS) in cooperation with USDA-APHIS-PPQ have conducted an annual male moth detection trapping program since 1970. In 2001 the Iowa Department of Natural Resources (IADNR) Forestry Bureau became involved with the gypsy moth trapping program because of budget cuts to the IDALS gypsy moth detection program. Forestry believes this is an important issue for Iowa's forest resource and has since provided labor in the form of its district foresters to help with the surveying of 57 of the 99 counties in Iowa.

A history of the number of gypsy moth catches and the number of acres treated for gypsy moth eradication in Iowa between1989-2005 can be viewed in Table 2. For more background information and the latest national maps for the movement of gypsy moth visit www.aphis.usda.gov/ppq/ispm/gm/.

Eradication Efforts

Eradication prevents establishment of the gypsy moth in new areas by eliminating isolated populations. Indications of isolated populations include: 1.) male moths caught in pheromone traps; or 2.) the presence of other moth life stages.

Eradication programs, utilizing insecticide spraying of a Bacillus thuringiensis (Bt) var. kurstaki are implemented by IDALS and USDA-APHIS-PPQ to eliminate the gypsy moth populations in Iowa.

Eradication Efforts

Bt is a pesticide derived from a bacterial toxin that affects only certain butterfly and moth larvae. A history of acreage treated with Bt since 1989 to eradicate gypsy moth is also shown in Table 2.

IDALS in cooperation with IADNR, ISU and USDA Forest Service have conducted extensive professional and general public education efforts. These efforts have ranged from the publication of gypsy moth brochures and identification cards, to formal training programs for professional nursery, arborists and foresters, and workshops for the general public and volunteers.

Current

In 2005 the following agencies were involved with gypsy moth trapping:

- U.S. Army Corps of Engineers (67 traps)
- City Foresters (91 traps)
- County Foresters (24 traps)
- U.S. Fish and Wildlife Service (34 traps)
- USDA-APHIS (1252 traps)
- IDALS (2521 traps)
- IADNR (1007 traps)

IDALS provided 6 people to set up traps, USDA provided 3.5 trappers and IADNR provided 12 foresters to set up the nearly 5,000 traps. The gypsy moth trap locations have been focused in cities, campgrounds, and around nursery operations. Along the Mississippi a trap was placed every 1500 meters to form a line of detection. Nine of our largest cities were also put on a 1500 meter grid.

The result was Iowa had only 4 catches in 2005, our lowest number in over 16 years.

A large number of volunteer trappers assist each year. It is easy to become a volunteer gypsy moth trapper by contacting: Aron Flickinger
State Forest Nursery
2404 South Duff Ave.
Ames IA, 50010

A pheromone trap is sent in May that can be hung with string or stapled securely to a tree. In September send the trap back to Aron for inspection. If it is determined that a population of gypsy moth is becoming established in your area, then a plan for spraying this insect will go into place. The more traps we can have volunteer set up the better our surveillance for the movement of this insect in Iowa will be.

SUDDEN OAK DEATH (SOD)

Phytophthora ramorum is the cause of the disease known as sudden oak death (SOD), ramorum leaf blight, and ramorum dieback. This pathogen has the potential to infect oaks and other trees and shrubs. For the latest information and a background of host species for this disease, visit www.suddenoakdeath.org.

The reason Iowa is monitoring for Phytophthora ramorum is because it is a quarantine pest and it may have been inadvertently introduced to all states outside the regulated areas in CA and OR on infested nursery stock in 2003-04 and again in separate incidents in 2004-05.

The Iowa DNR began by targeting 20 nurseries in Iowa that received potentially infected trace forward nursery stock from Monrovia Nursery. The survey started the last week of May and was finished July 21. Of these nurseries, 11 had the appropriate surroundings with host vegetation to sample. To complete the 20 nursery site quota, national retail outlets that sell nursery stock like K-mart, Lowes, Walmart and Home Depot were chosen because of their wide distribution of nursery stock across the country.

To see if the disease in already in a natural environment like a forest, transects were set up in 10 general forested areas across the state. Host material was inspected within nurseries by IDALS personnel. This provided sampling and visual inspection of nurseries within the nursery itself as well as sampling the outside perimeter of the nursery to see if this fungus could spread on its own into Iowa's natural plant community.

Samples were collected from around the state for both nursery and general categories. Samples were sent to both The Ohio State University and Mississippi State University. All samples came back negative for Phytophthora ramorum. Several species of oaks were sampled for bleeding canker like symptoms with the results coming back negative.

Plant disease personnel are still studying whether the disease could exist on oak in Iowa and be able to withstand the winters. Sampling for this disease will continue next growing season. Current philosophy is to err on the side of caution and take every effort to ensure this newly-discovered fungus does not become a problem for Iowa forests.

Gypsy Moth, Sudden Oak Death and Emerald Ash Borer (forest stressors that are not yet established in Iowa but threaten to enter Iowa in the future).

EMERALD ASH BORER (EAB)

Emerald Ash Borer is native to the orient, and was introduced near Detroit in the 1990's. Already, EAB has been found throughout the lower peninsula of Michigan, one county in the upper peninsula of Michigan, northwest Ohio, northern Indiana, and Ontario. Although not yet found in Iowa, EAB is judged as having more potential for future harm to Iowa forests than any other insect currently being dealt with in the United States.

EAB kills all ash species by burrowing under the bark and eating the growth (cambium) layers of the trees. EAB has been found capable of killing every ash tree in neighborhoods or woodlands. Ash is one of the most abundant native tree species in North America, and has been a preferred and heavily planted landscape tree in yards and other urban areas.

The Iowa Department of Natural Resources (DNR) Forestry Bureau in cooperation with Iowa State University Extension (ISUE) have been using protocols developed by the United States Department of Agriculture Forest Service (USFS) to monitor Iowa for signs of EAB. This past year's activity included visual surveys of ash trees in towns located in all 99 counties, visual inspection of ash sawlogs at 43 sawmills and inspection of 48 sentinel/ "trap" trees.

There are three ways the emerald ash borer could become established in Iowa. One is movement of nursery stock. With the voluntary moratorium on not purchasing ash trees from east of the Mississippi River by the Iowa Nursery and Landscape Association (INLA) this method of infection is preventable. A second method is movement of sawlogs to Iowa from out of state. With the price of hauling logs from the areas infested with EAB, it is economically unfeasible for sawmills in Iowa to purchase logs from MI, OH or IN. If EAB becomes established in one of our neighboring states, then this method of infection becomes more probable. The third method to be aware of is transportation of firewood. If a person from an area with EAB was to bring infested firewood (larvae or pupae under the bark) and not burn all the firewood in an Iowa campground, it would be possible for the insect to spread into living ash hosts here in Iowa. As a preventive measure, sentinel trees were placed in 2005 within one-half mile of campgrounds thought to be most likely to be visited by out of state campers.

EMERALD ASH BORER (EAB)

Sentinel trees are created in one of two ways. One method was to girdle standing ash trees up to 13 inches in diameter. If the emerald ash borer was present in the area with trap trees, it would be more successful in attacking one of these stressed sentinel trees. A problem with this method is it kills standing shade trees.

The second method of creating a sentinel tree involves using potted ash nursery stock greater than 1.5 inches in diameter. In 2005 Miller Nursery (Jim Poulsen) from Johnston donated 25 ash trees that would normally sell for $200 each for our project. These trees were not in saleable condition at the time but were still alive. We were able to plant these trees around campgrounds that did not have ash trees or did not want ash trees girdled. The trees were not planted properly and were not watered on purpose. We wanted them to stress and attract insects from the area.

Results for 2005 in Iowa show that the emerald ash borer was not detected in any visual survey or sentinel tree survey. The borers that were found include the roundheaded, flatheaded and sessidae that did attack the girdled and potted ash trees. Adult bark beetles were found on 6 of the trees as well. This gives collaborators some confidence that the insects are finding the ash trees, regardless of the method we used. Using potted trees gives us the advantage of placing the trees in open areas that are in close proximity to campgrounds. They take less time to inspect for insects, allowing for more sites to be evaluated. Standing ash trees were taller and larger in diameter, and the process of looking for borers was much longer. A map showing Iowa EAB survey locations is attached as Appendix B.

2006

Efforts in Iowa are under way for 2006 to:

- add county Conservation Board campgrounds to the list of locations to have sentinel trees.
- work with the INLA to obtain 50-100 donated ash trees that are 1.5" in caliper and larger for 2006 EAB survey
- speak about EAB monitoring program for Iowa at the County Conservation Board's annual meeting, INLA annual meeting, Iowa Arborists Annual Meeting, U.S. Army Corps of Engineers Foresters and Iowa State Parks Bureau

2006

- Obtain a list of zip codes of quarantined areas for campground staff to look for when campers check in
- Design and print a wallet size EAB card for handing out at meetings
- Use Tree City USA data base to find which towns in Iowa have the greatest percentage and the greatest number of ash
- Check on retail outlets for their source of firewood- inform them about EAB

Although not yet found in Iowa, EAB (Emerald Ash Borer) is judged as having more potential for future harm to Iowa forests than any other insect currently being dealt with in the United States.

In order to prepare for the 2006 season the IADNR is asking for help in obtaining donated ash nursery stock. We need living ash trees. Poor formed, stressed, frost cracked, or other trees that are not in a saleable condition would all work for this project. The trees do need to be able to be moved manually. If you can donate nursery stock material please contact Aron Flickinger at (515) 233-8067 to make arrangements for transportation of the trees. For more info on the most current status of the EAB log onto www.emeraldashborer.info.

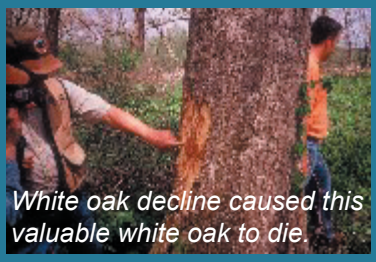
The longer we can keep Iowa free of the emerald ash borer, the longer ash trees will still be a viable tree in the landscape. A solid system of detection and monitoring is essential to this process.

WHITE OAK DECLINE

For a number of years, a phenomenon has been noticed in northeast Iowa regarding white oak mortality. Increasingly, instances of mature trees "standing dead" in the woods are being observed and reported. Aerial inspection of major Iowa forested lands is done each year by the Bureau of Forestry and this oak decline is readily observable from the air. This year, the aerial surveys detected continued presence of decline with Dubuque, Clayton, Jackson, Johnson, Lee and Allamakee counties having the highest incidence based on the 2005 aerial flight survey, see Table 1.

WHITE OAK DECLINE

Through a grant from the USDA- Forest Service, the Bureau is studying Iowa's white oak decline situation, searching for causes and management recommendations. Weekly observances were done in the spring when symptoms are most visible. Temperature measurement devices were installed in certain woodlands to check for frost damage. Leaf samples were taken during the summer to test for oak wilt, the results came back negative. Further sampling and test will be taken in 2006 as this problem continues to be monitored.



White oak decline caused this valuable white oak to die.

INVASIVE PLANT SPECIES

Invasive species are plants that are non-native to an ecosystem and cause or are likely to cause economic or environmental harm to humans, crops, livestock or natural plant and animal communities. Some examples of non-native species found to be a problem in Iowa forests are buckthorn, garlic mustard, honeysuckle and multifora rose. These invasive and exotic plants are out competing native forest species, diminishing fisheries and wildlife habitat, reducing water quality, reducing economic returns from forest management and tourism, and threaten long term forest sustainability and bio-diversity.

In an effort to establish a protocol for Iowa to monitor for the presence and severity of invasive species Heidi Asbjornsen, assistant professor at Iowa State University, was hired through a grant from the Forest Service. Accomplishments from the study are:

- A volunteer-based and scientifically valid survey methodology for documenting presence and severity of invasive plant species was developed to produce scientifically valid estimates of severity, yet suitable for training and execution by volunteers.
- Educational materials were produced and training workshops held at 17 sites training 287 volunteers in 2004.
- A brochure was produced for wide dissemination providing invasive species identification and explaining opportunities for volunteer participation.
- A website facilitating the training and participation of volunteers, public educational and outreach efforts, and the entry and management of volunteer generated data has been created. The web site is www.nrem.iastate.edu/invasive_species.

The Forestry Bureau is committed to developing better awareness about invasive species and their presence on both public and private lands. The Bureau has an invasive species coordinator that is on the board of the Midwest Invasive Plant Network (MIPN). MIPN is a regional group consisting of natural resource professionals employed by public and private organizations that are monitoring for invasive plants in the Midwest.

CONCLUSION

Iowa forests are generally healthy, and providing abundant forest products and amenities, including outdoor recreation opportunities, wildlife habitat, clean water, and the economic benefits of a vast array of wood and wood fiber products.

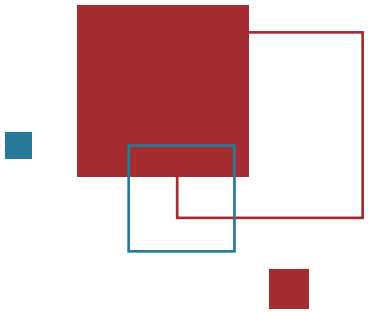
Iowa forests also have a variety of stressors, most of which are naturally occurring and always present. These stressors take a toll on Iowa forests however; native stressors are generally less than epidemic now.

Iowa forests are generally healthy, providing abundant forest products and amenities, including outdoor recreation opportunities, wildlife, habitat, clean water and economic benefits resulting from a vast array of wood and wood fiber products.

The Bureau of Forestry, through cooperation with other agencies has programs in place to counter forest stressors which have potential to move into Iowa and damage our forests. Those programs operated vigorously during 2005, and plans are in place for similar, continued vigorous forest health program operations in 2006.

Table 1:

Summary of Forest Health Activity as seen during the 2005 Aerial Flight Survey for Iowa. The 6 counties with the most damage are highlighted in bold.

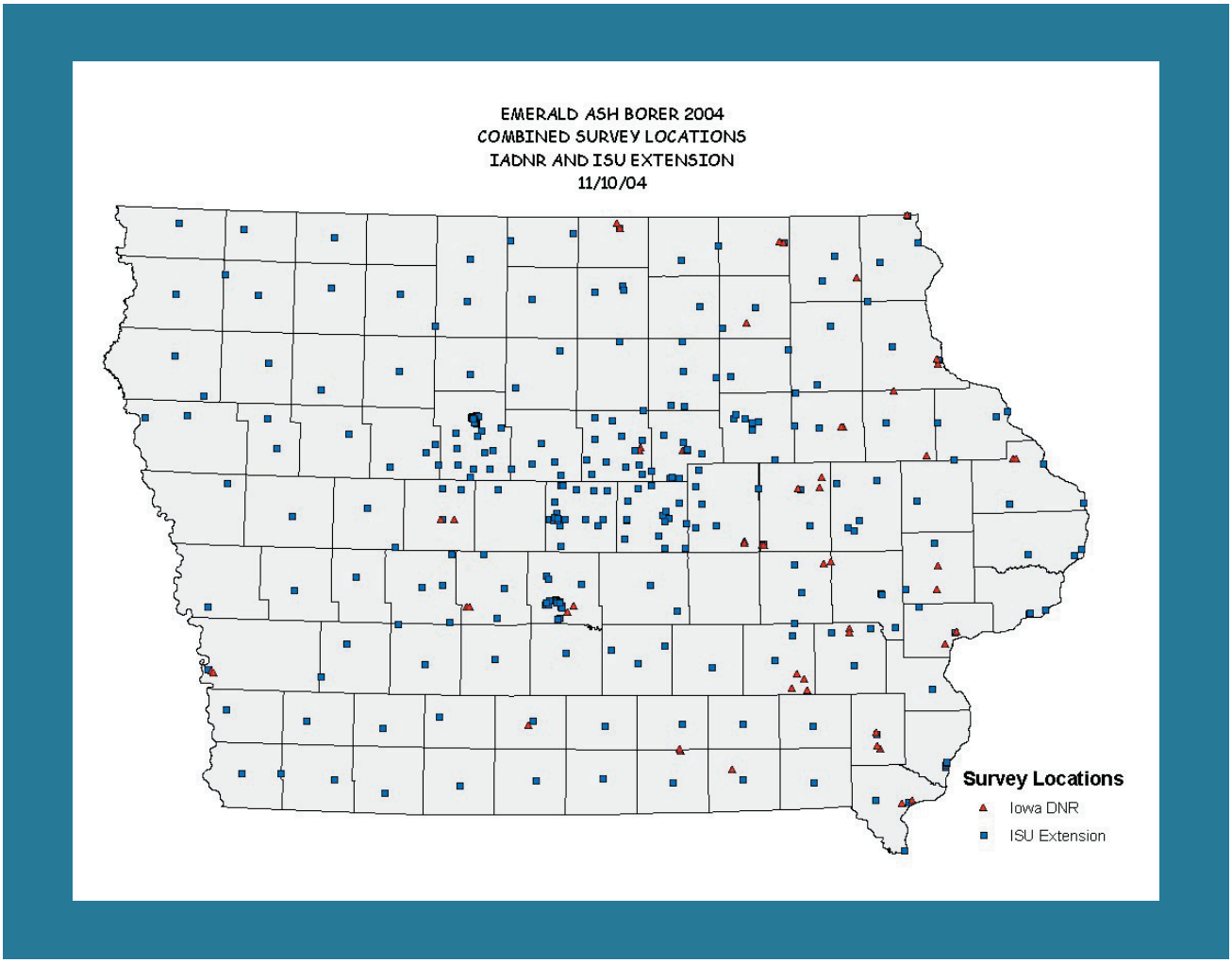


County	Dutch Elm Disease	Oak Wilt/ Oak Decline	Pine Wilt	Discolored Silver Maple/ Cottonwood	Flood Damage	Other
Allamakee	8	**57**	1	7		
Black Hawk	**96**	1		35		
Boone	37	31		**305**	235	
Buchanan	**51**	25		12		
Cedar	9	8				
Clayton	25	**95**				
Clinton	**54**	23		1		
Des Moines	35	7	1	7		2
Dubuque	**44**	**132**		50		
Humbolt	7					
Iowa	10			20		2
Jackson	23	**74**	5			
Johnson	18	**61**		34	3	1
Lee	14	**54**	1	8	1	
Linn	38	15		**101**	5	
Louisa	**56**	17		**150**		
Louisa						
Mahaska	12	9			40	
Marion	3	4				4
Marshall			80	**200**		
Muscatine	**44**	16	1	20	5	
Polk	11	5	100	**190**	75	4
Scott	31	14	2			
Tama	1	1		**259**	6	
Van Buren	23	22		10		
Wapello	3	12				4
Warren	15	3				
Washington	2					
Webster	11	17		26	18	
Winneshiek		8		20		
Totals (acres)	**1362**	**1422**	**382**	**2910**	**776**	**34**

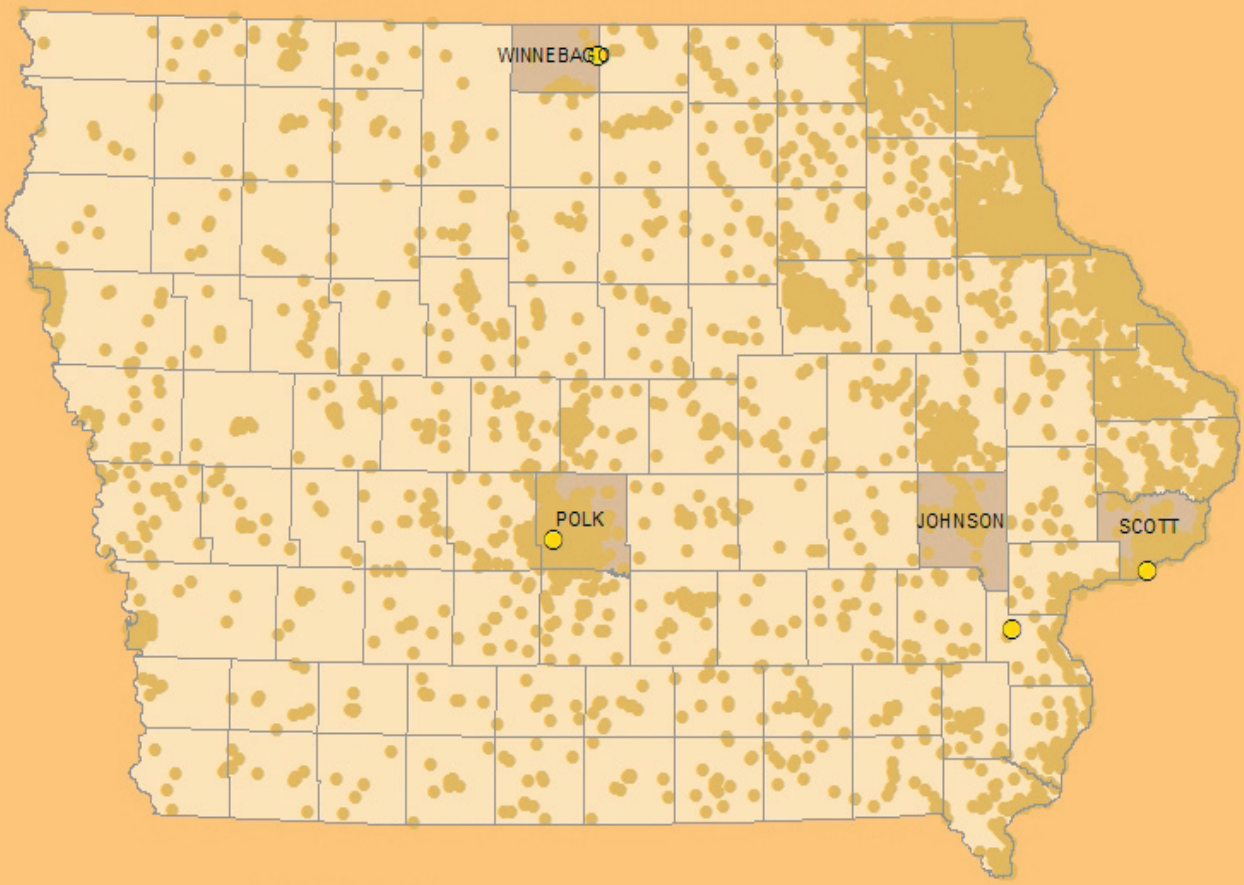
Table 2:

History of the Number of Gypsy Moth Catches and the Number of Acres Treated for gypsy moth eradication in Iowa (1989-2005). Unless specified, Bacillus thuringiensis var. kurstaki was the treatment method.

Year	Number of Traps used in Survey	Number of Multiple Catches	Total Number of Moths Caught	Number of Acres Treated
1989	2858		27	9
1990	2760		17	0
1991	2629		61	0
1992	4738		163	21
1993	4800		72	73.5
1994	5797		143	90
1995	6324		76	52
1996	5241		104	25
1997	5899		151	10
1998	7093		371	21.3
1999	7532		135	224 (pheromone flakes)
2000	6834		47	42
2001	5729		26	15
2002	5729		35	2
2003	3068		159	3 (carbaryl)
2004	4374		27	26
2005	4996		4	0



IOWA
GYPSY MOTH 2005
DRAFT SUMMARY



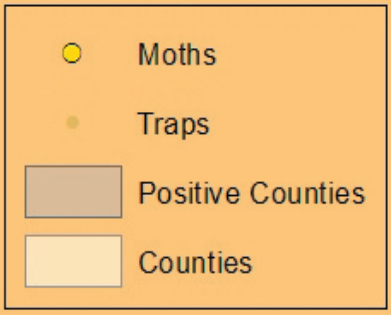
HIGHLIGHTS

- Aproximately 4876 traps were set.
- Four catches across the state. All single catches. See above.
- Catches include two at nurseries. One each in Polk and Winnebago counties.
- Multiple agency participation in survey. See table below.

COOPERATORS INVOLVED IN SURVEY

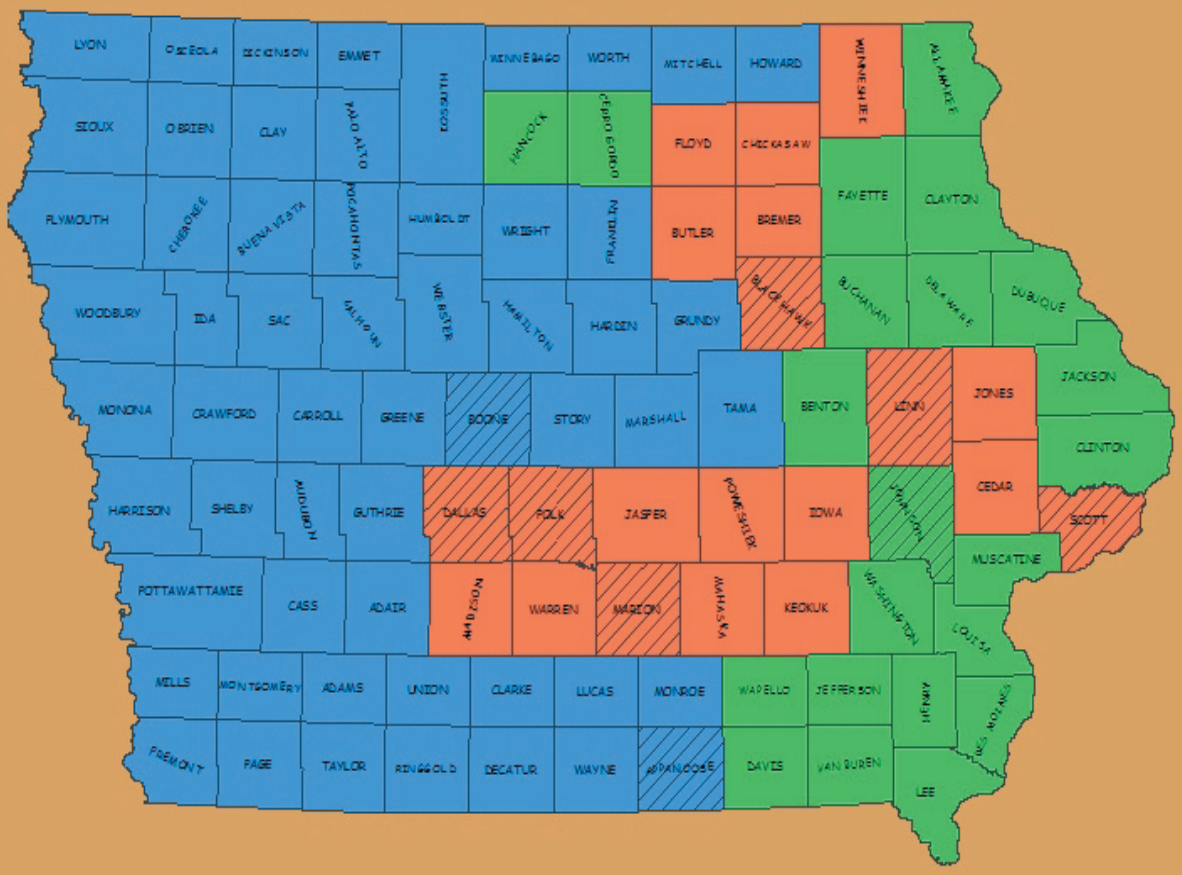
COOPERATORS	TRAPS
ACE	47
CITY FORESTER	91
COUNTY FORESTER	24
IADNR	887
IDALS	2521
USDA	1252
USFWS	34

LEGEND



Gypsy Moth Survey 2005

Coverage by Agency



Agencies

IADNR IDALS USDA

Addition agencies that participated include Army Corp of Engineers, County Foresters, City Foresters, United States Fish And Wildlife Services and IADNR volunteers. Each assisted by placing traps within their areas of responsibilities.

Maps furnished by USDA-APHIS-PPQ and ISU

For more information, contact:

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