

Great Plains Tree Pest Council

Best Western Westhills Inn
Chadron, Nebraska

April 10-11, 2001

The meeting was called to order by Laurie Stepanek, Chairperson.
Secretary: Les Koch

Attendees:

Henry Burkwhat – SD Dept. of Agriculture	Dave Leatherman, Colorado State Forest Service
Michelle Frank – USFS, Lakewood, CO	Dan Long – USFS, Rapid City, SD
Loren Giesler – University of Nebraska	Joel McMillin – USFS, Rapid City, SD
Mark Harrell – Nebraska Forest Service	Don Reynard, PFRA Shelterbelt Center, SK
Jeri Lyn Harris – USFS, Lakewood, CO	Bill Schaupp, USFS, Lakewood, CO
Marcus Jackson – North Dakota State University	Laurie Stepanek, Nebraska Forest Service
Bill Jacobi – Colorado State University	Jim Walla, North Dakota State University
Les Koch – Wyoming State Forestry Division	

Guests: Whitney Cranshaw (Colorado State University) / Doak Nickerson (Nebraska Forest Service)

Corrections and updates were noted in the mailing list, and copies of the 2000 minutes were distributed. Laurie Stepanek motioned that the 2000 meeting minutes be approved. Bill Jacobi seconded. Motion passed.

SPECIAL REPORTS

Whitney Cranshaw - What's up with insecticide options for shade tree pests?

Currently, there are tremendous changes in the turf/ornamental pesticide market. Many pesticides are being removed due to regulatory and marketing decisions. With that, an emergence of new products is being seen in the market. Organophosphate pesticides chlorpyrifos (Dursban) and diazinon are being phased out due to concerns about risks of exposure to children and crops. By December 31, 2001, all retail sales of chlorpyrifos will stop. Most agricultural and nursery uses of chlorpyrifos will remain. Cessation of all retail sales of diazinon will take place on December 31, 2004. Other significant changes in woody plant registrations include the restricted availability of Kelthane and the limitations on residential uses. What's new? Pyrethroids, which are derived from a natural product called pyrethrum, are now available. Some of these products include Talstar, Scimitar, Astro, Tempo, and Deltagard. Their active ingredient is pyrethrin. They are non-systemic, have variable persistence, and are very toxic to fish. Key pests controlled include most Lepidoptera (including borers), most Coleoptera, sawflies, and many Homoptera. Other products were discussed including chloronicotinyln/neonicotinyln insecticides, microbial derived insecticides, insect growth regulator insecticides, and plant-derived insecticides. Neem-derived insecticides are derived from extracts of the

seed of the neem tree. Despite the losses of Dursban and diazinon, new products are more promising. Too many department and home-improvement stores are still stocked with older products and are overlooking the newer product line. Specific recommendations were given for control of aphids, spider mites, leaf-feeding caterpillars, leaf beetles, wood borers, and bark beetles.

New developments in fungicides - Open Discussion!!

Laurie Stepanek wanted to discuss new developments in fungicides since we had learned about the new developments in insecticides from Whitney Cranshaw. Les Koch asked about the latest information on fireblight fungicides. Jim Walla stated that chemicals give inconsistent results and the best control for fireblight is prevention: good management (watering, pruning, etc.), plant resistant varieties, keep tools clean, and do not overfertilize. Loren Giesler mentioned that the Nebraska panhandle has fireblight problems while eastern Nebraska generally does not. Mark Harrell and Loren Giesler believe there may be an association with hail damage that occurred in the panhandle. Bill Jacobi mentioned that there is a big concern with introduced pathogens into the United States. APHIS and EPA are not doing enough to regulate against introduced pathogens. He also believes that we need more information on fungicides for the homeowner and industrial markets in the Western US. Dave Leatherman asked if there were any replacements for methyl bromide. Jeri Lyn Harris claimed that several books have been written about methyl bromide. Currently, options other than chemical fumigation are being used: solarization (extreme heat kills pathogens), mycorrhizae, soil steaming (very expensive), and subsoiling - tilling/turning soil at certain times to disturb pathogens. Nothing works when epidemic levels are present, otherwise treatments may work when pathogens are at endemic levels. Michelle Frank mentioned that state and private forestry is largely ignored due to other national issues. Bill Jacobi motioned that the GPTPC write a letter to Rick Cables, the new Region 2 Forester, addressing concerns about the lack of knowledge of availability, efficacy, information, and registration of fungicides/pesticides for plains states, and that this issue might be best addressed by Tom McClure, the incoming Pesticide and Invasive Species Specialist for Region 2. Motion passed. Les Koch agreed to write this letter and post on listserv for all members to comment.

Michelle Frank - Riparian focus group

The Forest Health Monitoring program and its components were explained. The FHM merger with FIA in 2000 has caused some communication problems between regional offices. There is also considerable controversy over the definition of a forested plot. Does one acre in size and 120 feet wide adequately address sampling riparian areas? Riparian areas often do not fall into traditional forested plot areas; therefore, a different definition of a forested plot needs to be established. Riparian areas are linear and the current plot system does not allow for riparian areas to be sampled. FIA believes that riparian areas are already adequately addressed. A riparian focus group has been formed to address this issue. The riparian focus group wants to know the current number of plots in riparian areas and if this number would change if the definition of a forested plot were modified. Riparian mapping is inconsistent and many states are asked about information concerning their riparian areas. FHM has proposed a riparian pilot project in the Delaware Basin in Delaware. The riparian focus group believes a project should be started west of the Mississippi River. Where is a good location for a riparian project in the west? One proposal was a project that represented a prairie, mountain, and desert riparian area. The definition of a riparian area must also be created to avoid confusion. States should

have definitions that benefit them. Overall, the present FHM plot system is ignoring urban forests and riparian forests. Insects and diseases in riparian areas are not well understood and a project in the west would fill a huge void of knowledge concerning riparian forest health. A letter from the GPTPC addressing the lack of representation of riparian areas in the current plot system was proposed. The National Association of State Foresters was identified as a good contact group to get out the word on riparian areas. Larry Kotchman, North Dakota's State Forester, will be Chair of the NASF. Marcus Jackson volunteered to be the author since he has good contacts with Larry Kotchman in North Dakota. Adding windbreaks to FHM sampling was also discussed.

Dave Leatherman - Slides of larval defoliators

Whitney Cranshaw has a set of beneficial insect flash cards. The set includes 55 laminated cards of predators and parasitoids and costs \$25 (money goes to Gillette Entomology Club - Colorado State University). Dave Leatherman presented 41 slides of larval defoliators and then passed out an order form. All slides are available for purchase, individually or in a photo CD. Dave received many additional slides from members at the meeting and will show these slides at next year's meeting.

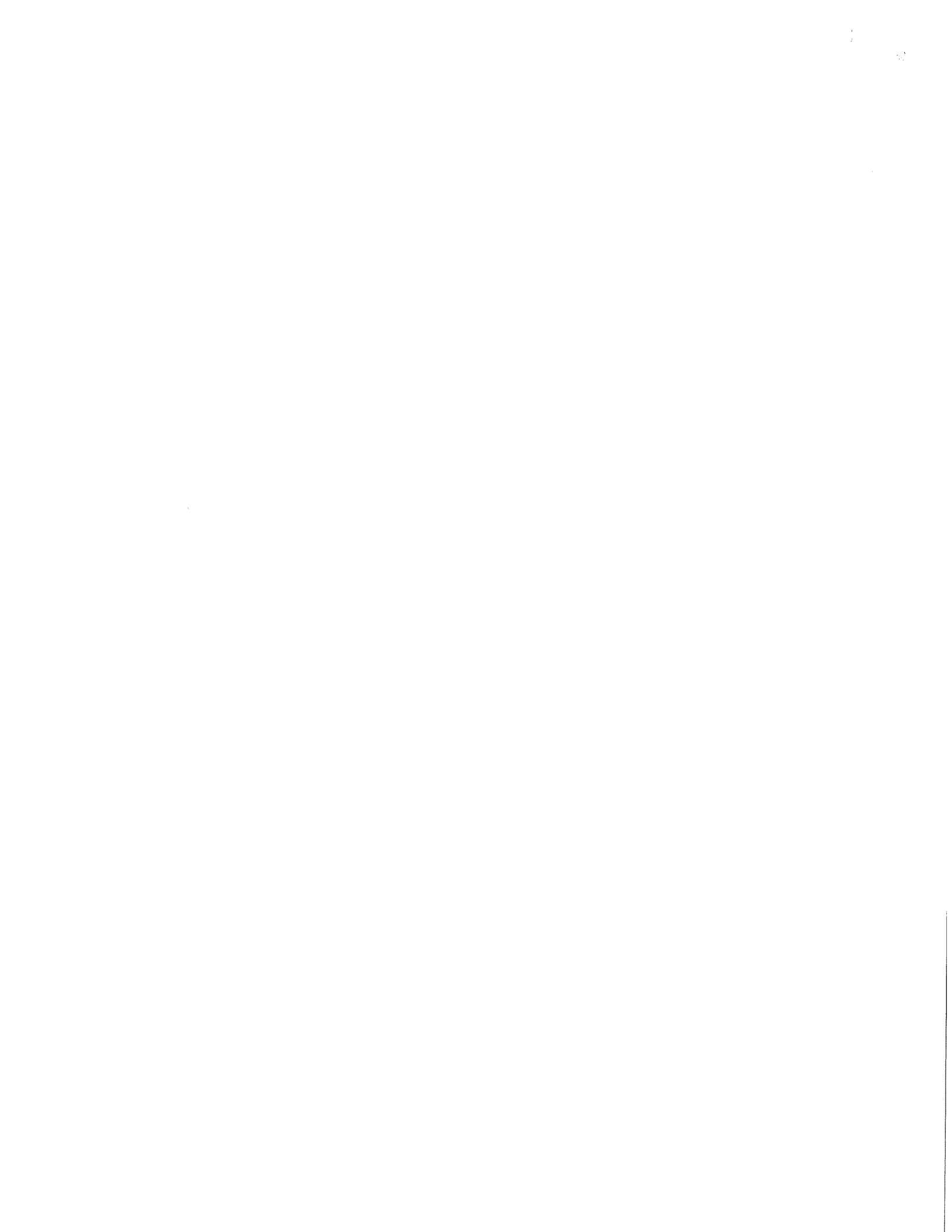
Organizational Reports

Bill Schaupp – USFS, Lakewood, Colorado

Dave Johnson's retirement has left a gap at the Lakewood Service Center. Position is currently open to current US government employees or those with reinstatement rights. Website information is regularly updated and they have a link to the Forest Service's Forest Insect and Disease Leaflets. Gypsy moth trapping is still being conducted. Rocky Mountain National Park has roughly 2 million visitors annually and one moth is usually captured annually. There is no indication of an established infestation. Nursery stock was introduced into Wyoming from non-quarantined nurseries in Michigan. Some stock was planted and some locations are known. There is an estimated 600 to 800 trees in prior years that have been shipped from Michigan to Wyoming and surrounding states. Gypsy moth trapping will be conducted this year and some trees may be sprayed with Dimilin. Douglas-fir tussock moth is a problem in southern Colorado. Western spruce budworm continues to be a problem on forested lands. Due to fire and defoliation from western spruce budworm, Douglas-fir beetle is evident in the Front Range. A graph of mountain pine beetle mortality from 1995 to 2000 was shown. Forests in the western slope of the Rocky Mountains are highly susceptible to spruce beetle due to blowdown and current populations already present.

Jeri Lyn Harris – USFS, Lakewood, CO

Last year a task force was formed to learn about white pine blister rust (WPBR) in Colorado, Wyoming, and adjoining states. WPBR has already been confirmed in Colorado and Wyoming and is believed to be present on limber pine in Nebraska. Limber pine is now promoted in conservation plantings, and currants and gooseberries are now being planted in the plains. Can these plantings threaten genetic resistance programs now in place? An effort must be made to monitor WPBR in the plains states. Phomopsis blight at Bessey Nursery - 2000 crop looks wonderful. The 1999 crop was lifted in spring 2000 and was used as an outplanted study. There are good survival rates after the



second growing season. Alternatives to methyl bromide are being explored: solarization (lay tarp over soil to increase heat in hopes of killing pathogens), dazomet fumigation, and fallowing. Hazard tree problems are evident in recreation areas. Hazard tree training will be offered this summer in Region 2.

Dave Leatherman – Colorado State Forest Service

APHIS is not properly addressing infested planting stock being shipped to the western US. Plant materials are now the main vectors for gypsy moth spread, not people. Much of the plant material that western nurseries purchase is from gypsy moth established areas. Trapping doesn't really address the problem. Personnel are being trained to look out for two exotic insects: Asian longhorned beetle and pine shoot beetle. Neither of these insects has been found in Colorado yet. Dutch elm disease appears to be down from last year, probably due to hot, dry conditions. Cynipid gall wasp is causing damage to Bur oak seedlings at the Colorado State nursery. There was a conifer sawfly outbreak in 1998-1999 in the Black Forest, east of Colorado Springs. Last year the trees had recovered without chemicals. Pine tip moth is causing damage in the southern plains portion of Colorado. The Zimmerman pine moth (3 species) is causing damage in the Denver area. Last year was a spectacular year for all rusts in Colorado. Pinyon pine decline is causing problems statewide. Ash yellows may be responsible for large-diameter green ash declining. Tree problems with magnesium chloride road-dust control agents are apparent. Deciduous trees show tip burn while spruce show purple needles.

Jim Walla – North Dakota State University

A project to screen for ash yellows on green ash is being conducted. This project is designed to look for variation in host tolerance in several cultivars of both green and white ash. Growth rates of green ash are much less the last five years as compared to 11 to 20 years ago. This has been evident in Colorado, Wyoming, Nebraska, Kansas, South Dakota, North Dakota, Manitoba, Saskatchewan, and Alberta. The overall impacts of ash yellows are not well understood. Ash is overplanted which may increase the problems with ash yellows. What is also unknown is the length of time ash yellows has been infecting green ash. A major concern is the lack of natural regeneration of ash in native woodlands. Ash decline may compare to Dutch elm disease in terms of losses. Tolerant cultivars must be developed. Existing ash have shown adequate tolerance to ash yellows, or the pathogen may have low aggressiveness. Ash yellows will have a huge impact on us, particularly in riparian areas. Ash and elm are the most important riparian species in North Dakota, and elm is already gone due to Dutch elm disease. The importance of ash in riparian areas in North Dakota cannot be understated. The impact of ash yellows in lilac in North Dakota was discussed. Many areas of chokecherry in North Dakota are not showing X-disease. There is too much resistance to select resistant clones. Currently, leafhoppers are being tested for X-disease on chokecherry and the results have been negative. Junipers have been declining in North Dakota. Many junipers have yellowing foliage; no insect has been associated with this decline. Fungicide treatments have not worked. Fertilizer applications have been promising.

Bill Jacobi – Colorado State University

Tree and turf research is ongoing. Wisconsin elm hybrids are being evaluated for growth and form. Colorado State University is cooperating with Denver Water to study the roots of cottonwood trees growing along the banks of the high line canal. Trenching in the canal showed root distribution; tree

roots running along canal corresponded to top and lower water levels. Pathogen survival in wood chip mulch and implications in landscapes were discussed. There is much concern over dunnage and packing wood from overseas being converted to landscape mulch. *Thyronectria* and *Cytospora* were inoculated into honeylocust and green ash and distributed in mulch rings around trees. Canker fungi were able to survive. Fungi can outcompete and take over degradation of mulch. The viability of pathogens in crating materials from our ports is not being properly addressed. Crating materials are being chipped and sold as mulch – huge implications in the landscape market. Pathogen survival lasts longer than originally thought: therefore, using different mulch than tree species is advised. White pine blister rust was also discussed. Training the nursery industry and the Colorado Department of Agriculture how to identify WPBR on plant materials is important. A magnesium chloride study is addressing salt tolerance of pines, Douglas-fir, ash, and cottonwoods.

Henry Burkwhat – South Dakota Department of Agriculture

The mountain pine beetle epidemic continues to grow and expand in South Dakota. Pine engraver beetle damage is visible in areas with extensive snow damage. Four gypsy moths were captured in 2000. Egg masses were found on imported Christmas trees from Michigan. No Japanese beetles were captured in 2000 although one adult was captured in 1999. Adelgids are established in South Dakota and were detected at several Christmas tree collection sites. Many of the herbicide drift complaints in 2000 involved trees.

Don Reynard – PFRA Shelterbelt Center

'Tree and Shrub Insects for the Prairie Provinces' is available for purchase; an address was distributed. The PFRA Shelterbelt Centre ships out 6 million trees annually. Several hundred inquiries relating to insects and diseases of trees and shrubs were received in 2000. Chemical treatments worked very well in controlling cottonwood leafmining beetle. Controlling chokecherry leaf spot at the nursery is very important as this disease can cause complete defoliation of seedlings by mid-June. Tests in 2000 showed Benlate and Bravo more effective than Funginex for chokecherry leaf spot control. There is a huge demand for hybrid poplars in shelterbelts. In 1997 and 1998, the Shelterbelt Centre established hybrid poplar plantations at six sites in Saskatchewan. Each plantation is roughly 15 acres and contains 10,000 hybrid poplars. Forest tent caterpillar, weeds, winter injury, and herbicides can cause damage to these plantations. Diseases are not currently a big problem.

Joel McMillin and Dan Long – USFS, Rapid City, SD

Most of our work is conducted on bark beetles, not plains insects. Brood sampling last fall and winter show that mountain pine beetle is thriving in the Black Hills. Douglas-fir beetle and spruce beetle are growing in the Shoshone National Forest, particularly wilderness areas. The Black Hills National Forest plan is now being revised. Jack pine budworm is causing considerable damage in plots in Nebraska. Ips and turpentine beetles are infesting hail damaged trees on private property in the Black Hills. Private landowners are concerned about this as well as the resulting fire danger. Currently studying the interaction between fire-damaged ponderosa pine and insects in the Jasper fire area. The efficacy of Astro and Sevin is being studied for controlling MPB. Two concentrations of verbenone (anti-aggregate for MPB) are being tested; the higher concentration works better. Co-authored a

publication comparing laboratory and field evaluations of Novodor and Raven for control of cottonwood leaf beetle.

Marcus Jackson – North Dakota State University

Windbreak decline in North Dakota was discussed. Many of these windbreaks were established in the 1930's and are declining. Renovating these windbreaks is a considerable challenge due to the lack of scientific knowledge. A video is being produced that will assist landowners explore ideas for renovation. Aspen is declining in North Dakota, mostly due to lack of fire. These stands are overmature and are producing little regeneration. Clearcutting has shown good results. Yellowheaded spruce sawfly attacks all species of spruce in North Dakota. This insect usually favors small to medium-sized trees. Forest tent caterpillar has been causing problems since 1997. No gypsy moths were captured in 2000. Individual moths have been captured since 1997. A big educational push has been established for monitoring Asian longhorned beetle. A survey at Towner state nursery showed Sphaeropsis shoot blight in ponderosa pine windbreaks near the nursery. A management plan to control the disease at the nursery is ongoing. Dutch elm disease is still present in a few smaller towns. Casaron applications are causing yellowing in blue spruce. North Dakota is now involved in FHM. We will be taking a conservative approach in our responsibilities with FHM.

Mark Harrell, Laurie Stepanek, and Loren Giesler - Nebraska

Pine wilt, caused by a nematode and carried tree to tree by pine sawyer beetles, is a big problem in Nebraska. The disease has progressed relatively quickly throughout Nebraska and the cause for this spread is unknown. A fall freeze last October resulted in many conifer crowns turning brown. Many of these trees were already stressed due to the previous year's lack of precipitation. A Cercospora blight control test was conducted. Humidity levels in the summer have been increasing over the last several years. A transparency of several towns and their average summer humidities was shown and the relation with the blight was discussed. Material at a warehouse in Omaha was inspected for possible Asian longhorned beetle presence. Crating material had signs of tunnels and frass but no live insects. Ash anthracnose caused loss of leaders on Autumn purple ash nursery trees.

Les Koch - Wyoming

Reports from John Walkowiak, Iowa Department of Natural Resources and Vicki Wohlers, Nebraska Department of Agriculture were distributed. Wyoming's Forest Health fact sheet was distributed. Wyoming state forestry participates in the survey component of detection monitoring. The plot component is established in Wyoming but state forestry does not participate. Douglas-fir beetle, spruce beetle, and mountain pine beetle are increasing throughout Wyoming. No gypsy moths were captured in 2000. The mistaken claim that dwarf mistletoe was infecting ponderosa pine in the Black Hills section of Wyoming was noted.

SPECIAL REPORTS

Marcus Jackson – Electronic presentations – what’s new and how to use it

A presentation on electronic media, primarily Power Point was conducted. Advantages and disadvantages of using electronic media for presentations were discussed.

Jim Walla – Insect and disease publications

Six thousand copies of ‘Diseases of Trees in the Great Plains’ were made. GPTPC members requested over 2,000 copies. Jim is interested in writing a publication on ash yellows. An insect handbook is available on the North Dakota State University’s website.

Bill Schaupp – National Risk Map

Approximately 70 million forested acres are at risk to insects and diseases according to the National Risk Map. An area is considered at risk if 25% or more tree mortality is expected over the next 15 years. This map can be updated annually. The under-representation of plains states on the National Risk Map was discussed. The USFS will create a US map of non-native invasive species. More information about the National Risk Map can be found at www.fs.fed.us/foresthealth/ross

Election of officers

Laurie Stepanek nominated Les Koch for Chairperson for the 2002 meeting. Joel McMillin seconded. The nomination was closed and Les was elected. Bill Schaupp nominated Joel McMillin for Secretary. Marcus Jackson seconded. The nomination was closed and Joel was elected.

2002 meeting date and location

The next meeting is tentatively scheduled for April 2nd and 3rd or April 9th and 10th in either Casper or Laramie, Wyoming. The meeting was adjourned at 1:06 pm, April 11th, 2001.

Respectfully submitted, Les Koch, Secretary

Handout
A

Report to the Great Plains Tree Pest Council
April 10-11, 2001; Chadron, NE

LAKWOOD SERVICE CENTER, FOREST HEALTH MANAGEMENT
USDA FOREST SERVICE, ROCKY MOUNTAIN REGION (R-2)

Service Center Staff:

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Plant Pathologist	Jeri Lyn Harris	jharris@fs.fed.us	(303) 236-3760
Computer Specialist	Bernard Benton	bbenton@fs.fed.us	(303) 236-8002
Biological Technician	Lee Pederson	lpederson@fs.fed.us	(303) 236-1020

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Group Leader	Frank Cross	fjcross@fs.fed.us	(303) 275-5061
Forest Health Monitoring Coordinator	Michelle Frank	mfrank@fs.fed.us	(303) 275-5006
Aerial Survey Specialist	Erik Johnson	ejohnson02@fs.fed.us	(303) 236-8001

Service Area: Colorado east of the Continental Divide and NW Colorado, all of Kansas, SE Wyoming (east of the Continental Divide and south of Casper)

Function: We provide technical assistance on forest pest problems and forest health issues to federal land management agencies. We cooperate with state and other federal agencies to provide assistance on state and private lands.

Websites: R-2, Forest Health Management www.fs.fed.us/r2/fhm
This *new* site, created by Jim Worrall, Plant Pathologist at our Gunnison Service Center, includes a bulletin board, reports, staff listings, links, and much more.
National Office, Forest Health Protection www.fs.fed.us/foresthealth
This site provides national program descriptions, forest insect and disease leaflets on line, publications, the national mortality risk map, and much more.

STAFF NEWS

David W. Johnson, Supervisory Plant Pathologist and Lakewood Service Center Leader, retired in January, 2001, following 31⁺ years of employment with the USDA Forest Service and distinguished service to his profession and to his customers. He has agreed to continue in a volunteer capacity. A job announcement for his replacement is currently open to those with federal government status and will close on May 2, 2001.

SUMMARY OF SELECT INSECT AND DISEASE CONDITIONS

Gypsy moth, *Lymantria dispar*: Each year, detection traps are placed in campgrounds and at other locations that have a high likelihood of being introduction sites for the gypsy moth, a quarantined insect. This is part of a cooperative effort led by the USDA-Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine.

The detection trapping sites were selected on the basis of elevation, presence of hardwood species, and potential for high numbers of out-of-state visitors. Several National Forest recreation sites in Colorado and Wyoming, Fort Carson Military Reservation, the US Air Force Academy, and Rocky Mountain National Park were trapped for gypsy moth during the summer of 2000. No traps were placed in Kansas. The assistance of Les Koch, Wyoming State Division of Forestry, is gratefully acknowledged.

A total of 56 gypsy moth detection traps were placed in the field in 2000. No gypsy moths were captured by these detection traps.

In addition to the detection traps in 2000, a total of 60 gypsy moth traps were deployed within Rocky Mountain National Park for delimitation of a possible infestation. One gypsy moth was captured by the delimitation traps.

The year 2000 is the second consecutive year of delimitation trapping in Rocky Mountain National Park, in response to captures of a single gypsy moth in both 1998 and 1999 in the Moraine Park Campground. When the delimitation traps were checked on July 28, one gypsy moth adult male was found alive in the Moraine Park Campground. The 2000 capture site is at the eastern edge of the Campground, unlike the 1999 and 1998 capture sites, which are less than ¼ mile apart at the western edge of the Campground. In both 1999 and 2000, gypsy moth captures occurred in July and early August, before a locally occurring gypsy moths population might be expected to mature and fly. Because only single moths were captured each year and because of the early timing of the 1999 and 2000 captures, there is no definitive evidence that a gypsy moth population is established within Rocky Mountain National Park.

The most reasonable interpretation of the 1998, 1999, and 2000 captures continues to be that the captured moths were isolated "hitch-hikers" from the vehicles of Park visitors. Taken together, however, localized gypsy moth captures in three consecutive years is cause for increased concern. Consultation with the Colorado office of the USDA - APHIS, the Colorado State

Forest Service, and other concerned parties occurred. Another delimitation effort will be conducted in 2001.

Troubling evidence was obtained by the Wyoming Department of Transportation, the Wyoming Department of Agriculture, and USDA-APHIS that large-size nursery stock from uncertified fields in Michigan were transported to the Jackson, Wyoming area in 2000. Michigan is within the zone generally infested by gypsy moth in the United States. It is not known for certain that these shipments were infested, but measures will continue against this possible introduction.

There is evidence that infested Christmas tree shipments were made to South Dakota, Nebraska, and possibly other states from Michigan in 2000. Taken together with the movement of suspect nursery stock, the year 2000 provided ample reinforcement to be vigilant against gypsy moth introduction. It is possible that shipments of nursery stock and Christmas trees from the generally infested zone have been received elsewhere within the Rocky Mountain Region within the past few years.

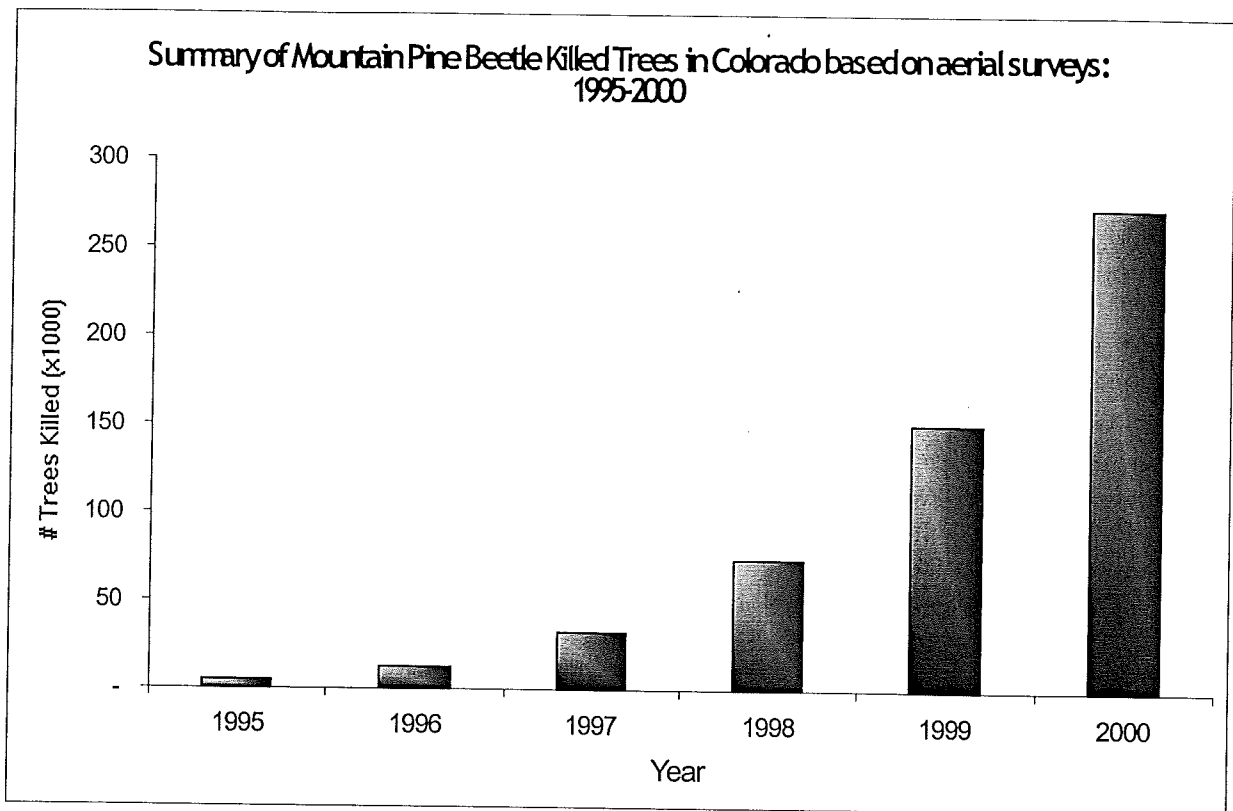
Douglas-fir tussock moth, *Orgyia pseudotsugata*: Infestations on blue spruce in urban areas along the Front Range continue. Especially noticeable was severe defoliation of blue spruce on Fort Carson Military Reservation. No moths were caught in low-dose pheromone traps in 2000 used as an early warning system in the upper South Platte River drainage.

sp. (**Western Spruce Budworm, *Choristoneura occidentalis*:** Western spruce budworm is beginning to appear in more locations in Colorado and Wyoming. It is causing defoliation on Douglas-fir, white fir, Englemann spruce and subalpine fir and areas of significant concern include: Medicine Bow Mountains SE of Saratoga, Front Range in CO near Evergreen and Bailey, Northern Sangre de Cristo Mountains, Northern and Eastern San Juan Mountains, and Uncompahgre Plateau.

Douglas-fir beetle, *Dendroctonus pseudotsugae*: The significant epidemic within the upper South Platte watershed, which expanded and intensified in 1999, continued in 2000. Affected areas include those near the Douglas-fir tussock moth infestation of 1993 – '95 and within and adjacent to the Buffalo Creek fire of May 1996. The fires of 2000 are expected to provide this beetle with additional breeding material, which may lead to epidemics around the perimeter of burned areas. Another Douglas-fir beetle epidemic is occurring in Central Colorado, West of Saguache.

Mountain pine beetle, *Dendroctonus ponderosae*: Mountain pine beetle populations have been building in various locations in Colorado since 1995. It is expected that this trend will continue. The following graph illustrates this increasing trend.

Beetle activity threatens several of ecologically and economically valuable landscapes. Areas of most significant concern in Colorado include the upper Arkansas and Vail Valleys, the Lake Granby area and nearby Middle Park locations such as the upper Williams Fork and East Troublesome Creek, southern North Park near Rand, and along the Front Range of Colorado. Areas of concern in Wyoming include the upper Platte Valley near the Colorado border.



Pine tip moths, *Rhyacionia* spp.: Ongoing control problems in pine plantings in Kansas have led to the idea that more than one species of tip moths is causing damage. Pheromone trapping on one property was conducted in 2000. More of this and other surveys are needed, but first a specialist able to distinguish the candidate species must be located. Efforts are ongoing.

Spruce beetle, *Dendroctonus rufipennis*. Although not usually considered a Great Plains tree pest in our area, it is worth mentioning that significant windthrow has occurred in many places in western Colorado and southcentral Wyoming since 1997. The susceptible forest conditions, combined with the abundant breeding material, makes it likely that beetle epidemics will be spawned from these downed trees that will result in the death of many standing, green spruce over the next decade. We have field evidence that this has begun to happen. Attention to this situation significantly reduced the ability of the Service Center's entomologist to provide service to other customers in 2000. Efforts are ongoing to try to mitigate this situation.

White pine blister rust, *Cronartium ribicola*: Since the 1998 discovery of this disease on limber pine in CO, a multi-discipline effort was started in 2000 to look at white pines in CO and surrounding states. Efforts are underway to collect a variety of data on central Rockies white pines, *Ribes* distributions, and hazard rate limber pine stands for white pine blister rust disease.

Phomopsis blight, *Phomopsis juniperovora*: The 2000 crop of Eastern redcedar and Rocky Mountain juniper at USDA Forest Service Bessey Nursery (Halsey, NE) were abundant with very little evidence of the Phomopsis epidemic of 1997-'99. Drier spring weather conditions and improved fungicidal applications helped keep *P. juniperovora* under control at this nursery. History plots in the juniper beds were monitored weekly for early detection of the disease.

Two-year old cedar seedlings from the 1999 epidemic were lifted in spring of 2000, evaluated for disease damage, and outplanted at 4 locations in Nebraska, Iowa, and South Dakota. The outplantings were evaluated for signs/symptoms of the disease and survival after the first growing season. These outplantings will be evaluated after a 2nd growing season and the Eastern redcedar seedlings' survival after exposure to the 1999 Phomopsis blight epidemic in the nursery.

AERIAL SURVEY MISSIONS AND OTHER PROJECTS

- Aerial surveys for insect and disease detection are performed annually on lands requested by federal resource managers and states as well as special project areas by Forest Health Management in cooperation with our State partners. Approximately 22 million acres were surveyed in 2000 in Colorado, South Dakota, and Wyoming. Some of the more common insect and disease impacts that were detected include bark beetles, defoliators, and subalpine fir decline. Once again, the most widespread damage agent detected was subalpine fir decline followed by mountain pine beetle infestations.
- Several landscape scale analyses are currently in various stages of development. The intent of these analyses is to portray the risks and potential impacts of major forest insects and diseases to resource managers. Forests involved include the Arapaho/Roosevelt and the Medicine Bow/Routt National Forests. A large-scale analysis of the spruce cover type to risk from spruce beetle was completed in 2000 and will be expanded to include all of Colorado and southern Wyoming in 2001. A "proactive" Environmental Impact Statement dealing with impending spruce and mountain pine beetle situations on the Medicine Bow - Routt National Forests was prepared in 2000 with significant Service Center and Regional Office involvement from our staff. It is expected that this EIS will be released in draft form very soon.
- Finding alternatives to methyl bromide fumigation of tree nursery soils continues at Bessey Nursery. Comparisons of seedling growth and soil pathogen populations were started in 1998 for 4 different pre-sow field treatments: methyl bromide fumigation, dazomet fumigation, solarization, and fallowing, *basamid*
- Long-term monitoring plots used to supply data for future disease models were re-measured in 2000. Data from Comandra blister rust and white pine blister rust permanent plots in Wyoming will be used for future rust disease models. Root disease permanent plots in Colorado and South Dakota will be re-evaluated 2001 and data used to calibrate root disease models for the Central Rockies. *→ did not seem to work*

RECENT BIOLOGICAL EVALUATIONS

Harris, J.L. 1999. White pine blister rust disease of limber pine in the Bighorn and Medicine Bow National Forests. USDA Forest Service, Rocky Mountain Region, Bio. Eval. R2-00-02. 8pp.

Schaupp, W. C. Jr. and Frank, M. S. 2000. Spruce beetle evaluation – 1999. Hahns Peak/Bears Ears Ranger District and surrounding areas, Medicine Bow – Routt National Forests, Colorado. USDA Forest Service, Rocky Mountain Region, Bio. Eval. R2- 00-05. 35pp.

RECENT SERVICE TRIP REPORTS

LSC-00-05. Snowy Range Windthrow and Spruce Beetle (Medicine Bow/Routt National Forests)

LSC-00-06. Aerial Survey of the State of Colorado

LSC-00-07. Aerial Survey of the State of Wyoming

LSC 01-01. Continuing fungicide laboratory tests for control of Phomopsis blight at Bessey Nursery (Nebraska National Forest).

LSC 01-02. Evaluation of Big Creek Lakes Campground project, Medicine Bow-Routt National Forests.

LSC 01-03. Evaluation of dwarf mistletoe suppression work at Gore Pass, Yampa Ranger District, Medicine Bow-Routt National Forests.

LSC 01-04. Gypsy Moth Detection Survey (LSC Zone)

LSC 01-05. Interim report on the outplanting project of Phomopsis blighted Eastern redcedar seedling from Bessey Nursery (Nebraska National Forest).

LSC-01-06. Site visit to Sledgehammer suppression project, Pike National Forest

LSC-01-07. Site visit to the US Air Force Academy

OTHER PUBLICATIONS

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**Report to the Great Plains Tree Pest Council
Colorado State Forest Service
Presented at April 10-11, 2001 meeting
Chadron, Nebraska**

Mountain Pine Beetle

This insect continues its increasing trend. Both ponderosa and lodgepole pine are affected, with the worst areas being near Buena Vista, Red Feather Lakes, near Bailey, near Granby and the Vail Valley. About 275,000 currently-infested faders were detected during August 2000 surveys. This compares with about 150,000 trees detected in 1999 and is in line with the 2:1 expansion this insect has exhibited since the beginning of the current epidemic in the early 1990's. It is estimated that at least 400,000 trees will fade in early-summer 2001. The peak of the 1970-80's infestation is thought to have been about 1,000,000 trees per year.

Spruce Beetle

The major blowdown area north of Steamboat Springs continues to develop about as predicted with populations now moving from the downed material into standing trees. (See USFS Biological Evaluation). So far, major problems have not been seen on private land, but it appears this is inevitable.

Douglas-fir Beetle

Major populations exist southwest of Denver in Douglas-fir damaged by Douglas-fir Tussock Moth and fire since about 1990. No end appears in sight until the beetles deplete the large-diameter material. Major forest management projects in the area may have some impact near Cheeseman Reservoir.

Balsam Bark Beetle (= "Subalpine Fir Decline")

This bark beetle, in combination with Armillaria Root Disease and abnormally mild winter conditions in the late 1990's, is killing large numbers of subalpine fir throughout the mountainous portion of the state. (See USFS aerial survey totals).

Douglas-fir Tussock Moth

Only significant activity was an unusual infestation in south-central Colorado in native white fir stand. In conjunction with Western Spruce Budworm, this insect severely defoliated approximately 100 acres.

Western Spruce Budworm

Appears to be on the rise along the Front Range. One small aerial treatment took place near Evergreen. Damage noted along the east flank of the Sangre de Cristos declined in 2000.

European Gypsy Moth

Total of 1647 detection traps and 319 delimitation traps put out by CSFS and the Lakewood Service Center of USFS caught a total of 6 moths in Colorado during 2000. Four of these were in detection traps, two were in delimitation traps. No serious problems at this time. Colorado continues to be concerned about the apparent inability of regulatory agencies to stem the

shipment of infested plant material from eastern states, particularly Michigan.

Asian Longhorned Beetle

None detected to date in Colorado, despite significant emphasis during arborist training, etc.

Common European Pine Shoot Beetle

None detected to date in Colorado. CSU pest surveys have been looking for this insect.

Dutch Elm Disease

Losses down in 2000, mostly due to dry, hot conditions. However, much vector "broodwood" was produced by these same conditions and a return to normal weather could well see an increase in disease incidence.

Nursery Problems

Of note at the CSFS tree nursery in Fort Collins were Shothole Leaf Fungus (*Blumeriella* (=Coccomyces?)) which affected chokecherry and a dramatic increase in Rough Bullet Gall Wasp in bur oak, which led to the culling of an entire crop of bur oak seedlings.

Abiotic Conditions

Severe summer dryness led to heavier than normal fall needledrop. Hail hit a large swath of the Black Forest in June 1999 and aerial surveys in August 2000 noted the area largely recovered, at least superficially. A few areas of unexplained "yellowing" exist along the southern Front Range. Ground checks could not find a biotic cause.

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OTHER INSECT AND DISEASE ISSUES IN COLORADO DURING 2000

INSECTS

Elm Leaf Beetle (*Xanthogaleruca luteola*) defoliation of elms, particularly Siberian elm, was noticeably increased in 2000 over the past several years throughout the eastern plains of Colorado.

Fall Webworm (*Hyphantria cunea*) defoliation and “tenting” of various hosts, particularly plains and narrowleaf cottonwoods, in Front Range canyons and on the eastern plains was abundant in 2000. Permanent injury to hosts is normally minimal.

A 1998-1999 infestation of sawfly (*Neodiprion fulviceps*) scattered over 20,000 acres of ponderosa pine “stringers” in the eastern Black Forest near Bijou totally collapsed in 2000. Very few trees suffered permanent injury.

Ponderosa Pine Needleminer (*Coleotechnites ponderosae*) is apparently back at epidemic, visible levels in the Black Forest, particularly the Elbert area. The Air Force Academy also reports 8000 acres.

Tiger Moth (*Lophocampa ingens*) occurred on many conifers in scattered locations throughout the lower elevations east of the Continental Divide. One unusual case involved infestation of pinyon at Ridgway State Park and this defoliator of conifer leaders was considered common in a survey of the Pingree Park area in Larimer County.

Overwintering adults of Brownheaded Ash Sawfly (*Tomostethus multicinctus*) staged an impressive late spring flight in the Boulder-Denver-Colorado Springs corridor but defoliation was thwarted by late frosts that apparently impacted egg hatch and early larval development.

Pine Tip Moths (*Rhyacionia neomexicana* in the northern plains and foothills and *R. bushnelli* in the southern plains, *Dioryctria albovitella* in pinyon statewide, and other minor species continue to cause chronic tip damage on seedling and sapling pine hosts.

Zimmerman Pine Moth (*Dioryctria zimmermani*) and relatives continue to increase in impact to ornamental ponderosa, Scots and particularly Austrian pines along the Front Range and eastern plains.

Peach Tree Borer (*Synanthedon exitiosa*) continued as a major pest of ornamental stone fruits in the Grand Junction area.

Carpenterworm (*Prionoxystus robiniae*) affected globe willow ornamentals in the Grand Junction area and was reported at chronically moderate levels in deciduous hosts in windbreaks and ornamentals in eastern Colorado.

Engraver Beetles (*Ips* spp. including *pini*, *knausi*, and *calligraphus*) continue to cause problems in ponderosa pine transplants and native trees impacted by human developments along the Front Range. One area particularly impacted on an annual basis seems to be the northern Black Forest, particularly Douglas (including the Parker area) and Elbert Counties.

The same could be said for Red Turpentine Beetle (*Dendroctonus valens*).

Spruce Ips (*Ips hunteri*) continued to kill tops and whole Colorado blue spruce trees in ornamental situations, including Greeley, the Denver metro area, and Pueblo. It is thought that our recent mild winters are contributing to the predisposition of attacked trees.

Pinyon Ips (*Ips confusus*) continues to be quite evident in southwestern and western Colorado. Often it is found in conjunction with blackstain root disease (*Ophiostoma wageneri*), and the fungal problem is probably the most important biotic agent. Both may be induced by adverse weather conditions. Log Hill Mesa south of Montrose and Glade Park west of Grand Junction are good examples.

Pinyon Needle Scale (*Matsucoccus acalyptus*) has reappeared in a historical area of periodic infestation near Nathrop. In combination with the areas "pinyon decline", considerable discoloration and dieback are occurring.

DISEASES

It was a very heavy telial sporulation year for various rusts on junipers and cedars, particularly cedar-apple rust (*Gymnosporangium juniperi-virginianae* in Rocky Mountain juniper and Eastern redcedar) on the extreme eastern plains, cedar knotgall rust (*G. bethelii* in Rocky Mountain juniper) in the Front Range foothills, and orange gall rust (*G. speciosum* on Utah juniper throughout the West Slope).

Very heavy fireblight (*Erwinia amylovora*) incidence was noted in the Beulah area to ornamental fruit trees, particularly apple.

Douglas-fir Needlecast caused by *Rhabdocline pseudotsugae* continues to be common in foothills regions west of the northern Front Range (Poudre and Rist Canyons, for example).

ABIOTIC

Drought stress is widespread statewide. Unusually high conifer seedling mortality was noted in native forest areas near Salida, but probably extends much beyond that.

Pinyon pines statewide are not looking good. Affected areas include native pinyon stands and many areas of planted ornamentals. The Buena Vista area is well-known for its "decline". Other areas of widespread dieback and death of this species include the southeastern plains east of Walsenburg (Pinyon Canyon and

Kim, in particular), the west side of the Sangre de Cristo Mountains near Crestone, near Canon City, south of Montrose, the Mesa Verde area, and northwest of Paradox. The widespread nature of these occurrences would seem to indicate a weather-induced cause. One local resident in the Kim area indicated a similar event occurred in the 1950's.

Large-diameter green ash in Grand Junction, the Denver area and other urban centers are declining. Biotic causes are difficult to assign to this, although the elusive Ash Yellows virus could be involved.

Dust-control materials utilizing magnesium chloride are being increasingly used in the mountain road systems in Colorado, with a corresponding increases in tree damage. Both coniferous and deciduous hosts have been affected, particularly Engelmann spruce and narrowleaf cottonwood.

Report for Great Plains Tree Pest Council meeting, Chadron, NE, April 10-11, 2001
From Jim Walla, Plant Pathology Department, North Dakota State University

1. Ash yellows of green ash (cooperators include Cheng, Guo)

Ash yellows research in progress or being planned involves determining the impact on commercially available ash cultivars and on ash regeneration in riparian areas, and developing management techniques, including identification of AshY-tolerant green ash germplasm. Green ash seedlings were inoculated with 10 AshY phytoplasmal isolates from eastern ND and 3 standard strains. After one growing season, a wide range in growth was caused by the 10 isolates, ranging from an average of 14% to 141% of the noninfected control seedlings. There was good agreement among three types of growth measurements in ranking of the isolates. The range of impact was wider than that of the standards, which had the previously widest known range of aggressiveness known for AshY. Nineteen ash cultivars that are otherwise recommended for use in our area were selected to evaluate AshY tolerance. Rootstock of a moderately and a highly tolerant green ash cultivar is needed for evaluation of AshY tolerance of the 19 cultivars. Grafting onto rootstock to produce softwood cuttings was highly successful. Rooting of softwood cuttings was very poor. The 10 AshY phytoplasmal isolates will be evaluated one more season before selection of strains for subsequent disease tolerance studies. Rooting will be attempted again to obtain clonal rootstock of green ash cultivars for selection of rootstocks and to provide plant materials for one means of disease tolerance evaluation.

2. Lilac witches'-broom (cooperators are Cheng, Guo):

Lilac witches'-broom (LWB), which is caused by AshY phytoplasmas, was identified in windbreaks in southeast ND in 1997 and 1998. Symptoms present on the sampled seedlings included combinations of yellow, distorted leaves, multiple shoots, late-season growth, and twig dieback. Two isolates of AshY phytoplasmas from lilac were used in aggressiveness trials in green ash. One lilac isolate was more aggressive than all others, and the other lilac isolate was relatively aggressive. The most aggressive isolate is one that was earlier found to severely stunt lilac in the greenhouse. Plans are underway to sample lilac from a variety of settings across ND to determine the distribution and incidence of LWB and to start attempting to identify an impact.

3. X-disease of chokecherry (cooperators include Cheng, Guo, Knudson, Neill, Reynard):

X-disease is the limiting factor in the use of chokecherry in the northern Great Plains. Regional chokecherry seed source provenance plantings established in 1983 by the Bismarck Plant Materials Center (PMC) near Apple Valley, ND and Ft. Sully, SD, as well as native and planted stands of chokecherry, are being examined to search for tolerance to X-disease. All chokecherry plants in the Apple Valley PMC germplasm collection were examined again in 2000 to monitor disease development. Only 25% of the original 3,236 plants remain alive (and all are infected), 17 (2.1%) of the 794 live plants remain in the original select category of having very good vigor and few or no X-disease symptoms, and 18 others have slightly lower disease ratings than the select plants. X-disease-like symptoms have never been observed on only 3 plants.

The Ft. Sully PMC planting was rated for X-disease severity for the first time in 2000. 41% of the original 2,792 plants remain alive. 429 (37%) of the 1,146 live plants were in the select category. 127 of the 150 seed sources that were planted contain select plants, and 77 seed sources have symptomless plants. These are extremely high numbers and are very different from

what has been seen in the Apple Valley planting, where most clones had no select plants. It appears that the disease has not developed enough to allow selection of tolerant germplasm.

Variability in the pathogen is being examined for use in tolerance studies, development of better detection methods, and basic understanding of phytoplasma genetics. Primers were developed for PCR amplification of the 23S rRNA gene for the first time from any phytoplasma. These primers were used to amplify the 23S rRNA gene from other phytoplasmas, so they can be used for phytoplasma detection. Primers were also developed for PCR amplification of the 16S-23S rRNA spacer region. RFLP analysis of 16S and 23S rRNA genes and of ribosomal protein genes showed no difference among 43 X-disease phytoplasma isolates from chokecherry. Sequencing of the 16S/23S spacer region revealed variation at four positions among 12 isolates from chokecherry. The analyses indicated that X-disease phytoplasmas are genetically different from the standard strains of other X-disease phytoplasma subgroups.

A system for tissue culture micropropagation of chokecherry was published. All select plants and plants with various levels of disease severity were obtained in tissue culture for clonal propagation.

Leafhoppers collected from chokecherry by Don Reynard are being assayed for X-disease phytoplasmas to identify possible vectors. Positive control leafhoppers were finally obtained to confirm efficacy of the DNA extraction method, and assays of the collected leafhoppers is underway.

4. Ponderosa pine seed source provenance trial

Lophodermium needle blight has caused severe defoliation to ponderosa pine in northeast ND. Apparent resistance was observed, indicating the possibility of selecting resistant seed sources. In 1986, 100 provenances of a regional ponderosa pine seed source provenance trial were planted specifically to identify seed sources resistant to this disease. The pines were inoculated in 1999 to identify sources of resistance to this undescribed *Lophodermium* species. A fire swept through the planting in 2000 and killed the needles and branches in the lower canopy. None of the inoculum appeared to survive the fire. It was not possible to determine if there were infections in 1999. The inoculation will be started over.

5. Unknown juniper decline and dieback problem (with Jackson):

Junipers in Bismarck developed serious decline and dieback problems by 1995, and problems continue today. The decline and dieback were observed in landscape plants and in nursery stock. In some plants, the condition is initially expressed by death of individual twigs. The area of dead foliage gradually expands, and many junipers either die or lose their ornamental value. In other plants, vigor is reduced, a portion of the live foliage is severely chlorotic, and many shoots die, either in patches or scattered throughout the plant. Repeated observations and fungicide trials were made from 1995 to 1997 to determine the cause and attempt control of the dieback. The cause was not determined and control was not obtained.

Another approach to address the problem was taken in 1999 and 2000. Various macro- and micronutrient treatments were applied in replicated trials throughout the growing seasons, and notes were taken regarding the condition of each plant. In 1999, a mixture of micronutrients (STEM) with or without a nitrogen supplement (Miracid) appeared to provide the best results compared to the water control, while manganese or iron, each with Miracid, provided the worst

foliar application

results. From 1999 to 2000, manganese with Miracid and STEM micronutrients provided the best response. During 2000, Miracid alone provided the best response. Overall, manganese with Miracid provided a response slightly better than the control, while all other treatments similar or worse than the control. Supplemental nutrients do not appear to help the affected plants.

Other ongoing projects that have no new results in 2000

Heritability of resistance to *Rhizosphaera* needle cast of spruce.

Stem decay of green ash.

Effect of plant genetic diversity on disease development.

Axenic culture of *Cronartium* species.

Biology, damage, and source of Comandra blister rust in ND.

Incidence, damage, and source of white pine blister rust in ND.

Lirula needle blight of spruce.

Western gall rust of pines.

Identification and management of juneberry problems

Maintain record of Limber pine condition

Recent Publications

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Walla, J.A., Jacobi, W.R., Tisserat, N.A., Harrell, M.O., Ball, J.J., Neill, G.B., Reynard, D.A., Guo, Y.H., and Spiegel, L. 2000. Condition of green ash, incidence of ash yellows phytoplasmas, and their association in the Great Plains and Rocky Mountain regions of North America. *Plant Disease* 84:268-274.

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Forest and Shade Tree Disease Studies

Spring 2001

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Shade Tree Disease Studies:

1. continued a third season of monitoring tree growth, tree water potentials, soil moisture, and turf production under three irrigation treatments at the Tree and Turf Research Facility.
2. continued a third season to determine if wood chip mulch is a potential inoculum source for canker pathogens.
3. continued to evaluate Wisconsin elm hybrids for growth and form.
4. published the "Insects and Diseases of Woody Plants of the Central Rockies" cooperative extension guide.
5. continued the water potential study of old growth cottonwoods along the Highline canal in Denver CO.

Results:

1. Tree and turf growth:

- Tree water potentials of green ash and honeylocusts were significantly affected by irrigation amounts. Water potentials of trees in low irrigation areas differed from moderate and high irrigation amounts.
- Stomates never closed on either species even during our hot dry summer
- Honeylocust and green ash diameter and height growth was less on 40 & 80 % than 160% ET.
- Turf grass growth was positively affected by higher irrigation amounts.
- Soil moisture was less at the 1 & 2 ft. depth under grass alone than trees and grass at the 40% rate.
- Soil moisture was less at the 1 ft. depth under grass alone Vs grass and trees at the 40% ET Vs 80 & 160% ET.
- Soil moisture was not different between 80 and 160 % ET. Wow "where have all the waters gone"?

2. **Wood chip mulch:** The study at our Tree and Turf facility is continuing to determine if uncomposted wood chips can harbor inoculum of canker pathogens (*Thyronectria* and *Cytospora*) and how long does the fungus remains viable. Low and high irrigation treatments (40% and 160%) did not affect viability. So far colonized branch pieces have contained viable fungal tissue for 56 weeks. Position on or in mulch has given us variable results. Percent moisture of wood at time of collection did not explain viability. We hope to look at actual infection hazard and what composting will do to the pathogens. We also are interested in cooperating with folks on the potential for pests in wood chip mulch from pallets and other foreign wood products.

3. **Evaluation of Wisconsin elm hybrids:** Hybrids from the Wisconsin breeding program were evaluated four years after planting for growth, form and resistance to *Cytospora* canker. Several selections seem to have outstanding form and growth rates. No new news on these trees other than field mice love to girdle the trees if you have weed barrier around the trees. I am proposing a national elm trial be established.

4. **Cytospora Canker:** We are putting on hold our analysis *Cytospora* canker fungi isolates of different "species" and hosts to see if the DNA will tell us if the fungi are different
5. **Old Growth Cottonwoods:** We are studying the water status of old cottonwoods via pressure bombs, soil moisture from neutron probes and observation wells, along a 100 yr.-old irrigation canal that runs through metropolitan Denver. The water may be shut off from the canal and we trying to find how long the trees can handle reduced water etc. We hope to use the study to also look at cottonwood's susceptibility to *Cytospora* under various drought stress scenarios. These trees do shut their stomates when they are

stressed.

Plans for 2001:

1. Continue mulch/inoculum, canker resistance, elm and tree and turf growth studies at the tree and turf research site.
2. We have some funding to look at the impact of "Safe Salt" (MgCl) on woody plants in Colorado. This is a cooperative project with Grant Cardon and a student of his in Soil and Crop Sciences.
4. Continue cottonwood -canal drought stress study.
5. Find funding to maintain and expand studies at tree and turf research site.
2. Conduct physiological studies related to tree growth and health at the Tree and Turf research site.
3. Help organize a national elm trial in conjunction with NCR 193. This is on hold since I have to direct my energies to existing projects.

Forest Tree Disease Studies in 2000

1. We are still working on spatial relationships of **Armillaria root disease** and site features in the Black Hills of SD. We hope to send the two manuscripts off soon.
2. In cooperation with Forest Health Management, Rocky Mt Research Station, US Forest Service, BIA, continued a study to see if aerial IR photos would pick up **black stain root disease** and **Ips beetle damage** in pinyon, and determine if there are any site or stand conditions related to the incidence of these damages. We are also looking at the impact of black stain root disease on the pinyon pine ecosystem based on analysis of vegetation cover and pinyon mortality rates. These studies will be wrapped up this summer

In 2001 our plans are to:

1. In cooperation with Forest Health Management, US Forest Service, finish analysis of the influence of meteorological, site and soil factors on the spatial small (1/2 mile) and landscape scale distribution of **Armillaria root disease** on ponderosa pine in the Black Hills.
2. In cooperation with Forest Health Management, US Forest Service, complete a research project on black stain root disease of pinyon pines in southwest Colorado. We are looking at spatial relationships of disease incidence with site, soil and management activities and determining the impact of the disease on the pinyon/juniper forest type.
3. Continue to facilitate coordination of folks working on white pine blister rust on five needle pines of the Central Rocky Mountains.
4. U.S. Forest Service funding is making it possible to study (2001-2004) the risk of white pine blister rust to five needle pines in Colorado. "We" (six different FS workers and Bill J) will be mapping white pine locations, determining fire impacts on five needle pines, making Ribes monitoring meteorological conditions in currently infested areas, and several folks will be establishing plots to determine the status of five needle pines and also assess white pine blister rust.

Publications:

Walla, J. A., Jacobi, W. R., Tisserat, N. A., Harrell, M. O., Ball, J. J., Neil, G. B. Reynard, D. A., Guo, Y. H. and Spiegel, L. 2000. Condition of green ash, incidence of ash yellows phytoplasmas, and their association in the Great Plains and Rocky Mountain Regions of North America. *Plant Dis.* 84:268-274.

Colorado State University Cooperative Extension. 2000. Insects and diseases of woody plant of the Central Rockies. *Bulletin* 506A. 284 pp.

Kepley, J. B. and Jacobi, W. R. 2000. Pathogenicity of *Cytospora* fungi on six hardwood species. *J. Arboriculture.* 26: in press.

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White Pine Blister Rust: an Invasive Species Threat to Our White Pines

William R. Jacobi and Ronda D. Koski, Dept. Bioagricultural Sciences and Pest Management, CSU, Fort Collins CO 80523

PLEASE DO NOT BRING WHITE PINE BLISTER RUST INTO OUR REGION ON NURSERY STOCK



White pines grow in open exposed areas, in pure stands or in mixed species stands

The Disease

White Pine Blister Rust is a lethal canker disease caused by the fungus *Cronartium ribicola*. The fungus requires two different plants to complete its life cycle: white pines (five-needle pines) and *Ribes* species (currants and gooseberries). The fungus can not move from pine to pine but has to cycle through *Ribes*. The fungus was introduced into North America on the east and west coasts around 1900. This fungus is very lethal to native pines since these pines did not evolve with this fungus and have limited resistance. Currently in Colorado, the disease is present only in a few stands of young limber pines located along the Colorado/Wyoming border.



Branch death from a rust canker on limber pine

At Risk Pines

All white pines are susceptible to White Pine Blister Rust. Species of pines that have needles in bundles of five are referred to as 'white pines' or five-needle pines'. Bristlecone, limber, southwestern white, and whitebark are white pines native to the Rocky Mountain region. Historic bristlecone and limber pines are valuable components of the region's high elevation ecosystems. Many organisms depend on these trees for food and shelter. These trees are some of the few species of trees able to survive on harsh, exposed, high elevation sites. At high elevations, snow retention on slopes may be affected by the decline of native white pines growing in these areas.



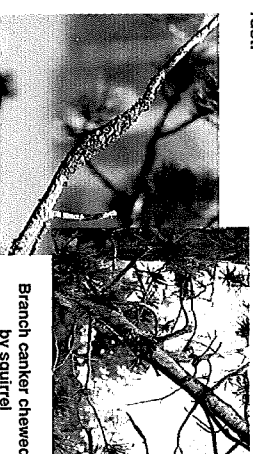
How Can This Fungus Get To Our Forests?

1. By the transport of infected nursery plants including both white pines and *Ribes*. White pine nursery stock has been found with the fungus several times in Colorado. With so much development in the region, infected nursery stock may be planted within a few feet of native white pines.
2. By wind movement of spores over long distances.

What To Look For

On Pines: Branch mortality is the most obvious symptom of White Pine Blister Rust. Initial infection takes place through needles in late summer and then the fungus grows into branch bark. If the infection is within 4-8 inches of the main stem, the fungus will grow into the stem and girdle the tree. Blister symptoms occur 2-3 years after needle infection. In early summer look for orange-yellow blisters that push through the bark. In late summer look for slightly swollen areas on branches and stems that are rough and blistered.

On Ribes: Look for orange-yellow, fuzzy discoloration on bottom of leaves. There are several rusts on currants. Non *Cronartium* rusts are more brightly colored and smoother looking when compared to white pine blister rust.



What To Do

Please report all findings of this disease to Mitch Yergert at the Colorado Department of Agriculture (303) 239-4142. **Destroy symptomatic plants by burning or burying. Do not save the tree for firewood or chip for mulch.**



White pines grow at from 6,000 to timber line and are found in all National Forests of the Rocky Mountain Region



Ribes leaves with white pine blister rust fungus



Non-Cronartium rust on Ribes

For more information

Contact your local Cooperative Extension Office, USDA Forest Service, Colorado State Forest Service, or Colorado State University, Department of Bioagricultural Sciences and Pest Management, Bill Jacobi wjacobi@agsci.colostate.edu 970-491-6927

South Dakota Department of Agriculture, Resource Conservation and Forestry
Report to Great Plains Tree Pest Council
April 10, 2001

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Mountain pine beetle (*Dendroctonus ponderosae*)

The current Mountain Pine Beetle (MPB) epidemic continues to grow and expand into new areas. In 1995 there were 1,508 trees killed. In 1996 there were 5,219. By 1997, there were 11,383 and in 1998 there were 25,562 trees killed. In 1999 the beetles killed 35,090 trees. The state is working on state and private lands to help minimize damage to the area through thinning, fire hazard reduction, and infested tree removal. Using the conservative assumption that the 35,090 trees killed had a 10-inch diameter, 1,530,480 board feet were lost. In other terms, there is about 12,000 board feet in an average home, the mountain pine beetles destroyed enough timber to build 128 new homes.

Pine engraver beetle (*Ips pini*) is a pest of ponderosa pine and the population has expanded rapidly in areas with widespread winter storm damage. The storm damage is predominantly in the eastern and southern portions of the Black Hills. The beetles built up in the snapped off debris and have moved into healthy trees. Some infested pockets contain as many as 20 to 30 trees.

Ash/lilac borer (*Fraxinus pennsylvanica*) ^{ash not the insect} These boring pests have caused lodging of green ash in shelterbelt plantings on private lands.

Pine tip moth – endemic - no outbreaks reported this year

Elm leaf beetle (*Pyrrhalta luteola*)

These leaf skeletonizers are throughout the state on residential trees.

Gypsy moth (*Porthetria dispar*)
Lymantria

Trapping throughout the state resulting in catching 4 male moths. Two were caught in Minnehaha county on the east side of the state and two in Pennington county on the west side. The catches are attributed to movement of tourists from infested areas. Egg masses were found on imported Christmas trees from Michigan. The South Dakota Department of Agriculture will increase trapping in areas where trees were sold.

Japanese beetle

This insect has been monitored through trapping for the past few years in South Dakota and it is still not established within the state. There have been a few beetles caught in the past, one in 1999, but none in 2000.

Adelgid (Homoptera/Adelgidae/pineus sp.) Although not in the literature, this pest is established in South Dakota. It is established at least from the south central part of the state and west into the Black Hills. It may have entered through nursery stock or may have been imported on Christmas trees. Christmas tree collection sites were inspected in Rapid City in December 2000 and adelgids and white pine aphid were found on several trees. *on p.pine*

Diseases:

Ash Rust was a major problem in areas with the alternate host, cordgrass.

Diplodia

Although widespread, this disease is seldom a lethal disease on ponderosa pine in the Black Hills. This disease has become severe in areas when hail has caused damage during spore dispersal.

Western gall rust

Widely distributed in the Black Hills area contributing to the death of small ponderosa pine trees. The disease also can be found on the limbs of larger trees but normally is not a severe problem.

Dutch elm disease

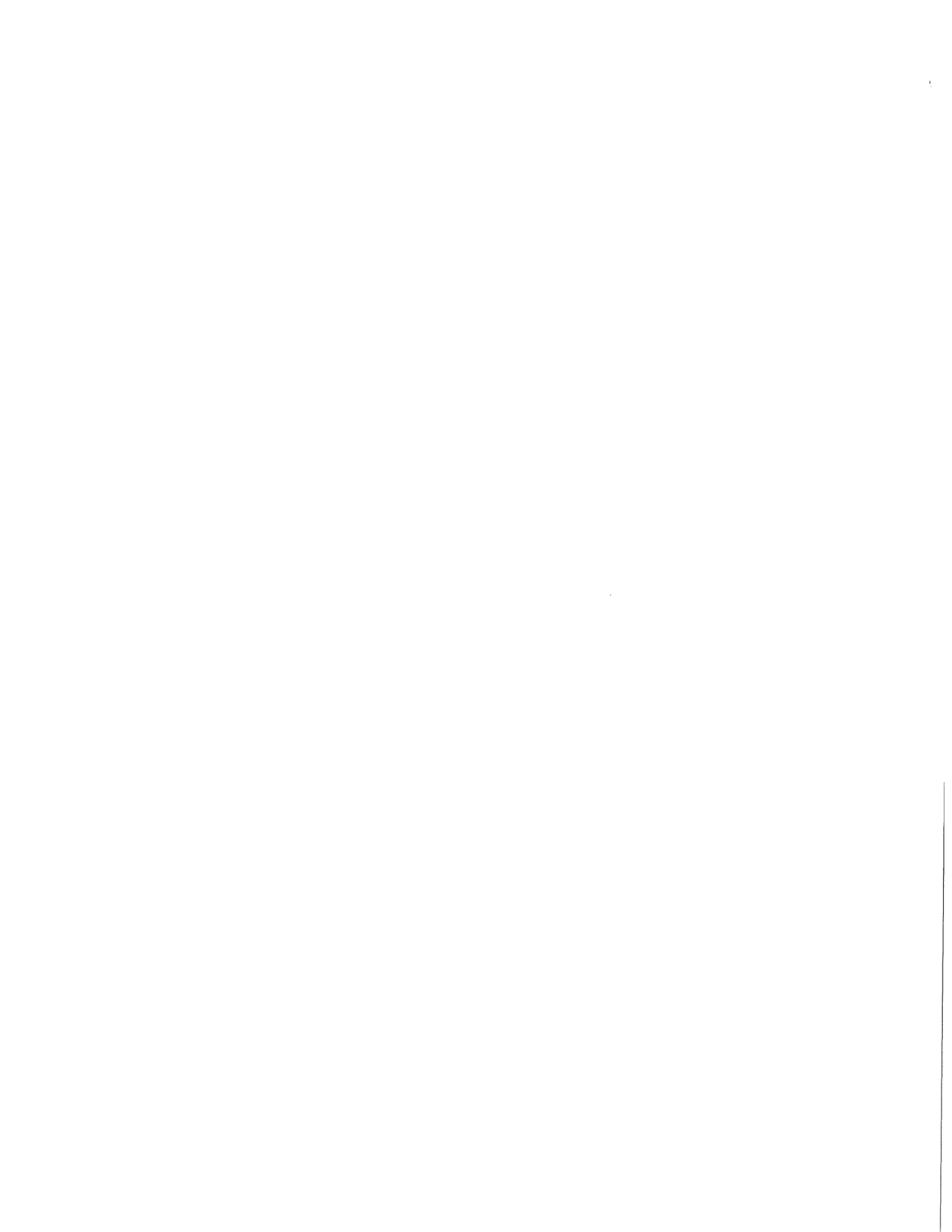
This disease is progressing throughout the state.

Abiotic Damage

A hailstorm last June damaged about 2,000 acres in the Sheridan Lake rd. area. The damage is worse in some areas and several trees were killed but the overall damage can not be assessed at this time. This may be another area where Ips may be a problem since they also were hit with winter storm damage earlier in the season. Diplodia may also become prevalent but it remains to be seen.

Deep planting is still a major problem with ornamental plantings, some dirt is good, and more must be better.

Herbicide damage has been increasing over the past couple of years along with a shift in chemicals. There were 130 herbicide drift complaints during 2000 and 40 of those involved trees. In the past, 2,4-D and Dicamba were the primary herbicides found when drift complaints were investigated. There has been a shift to having glyphosate as the primary herbicide found drifted onto trees. This shift is probably a result of increased use on roundup-ready soybeans and corn, coupled with more obvious exposure symptoms.



(F)
4/11/2001

Report to the Great Plains Tree Pest Council

Don Reynard
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2000 PEST REPORT

In 2000, we received approximately 700 inquiries relating to insects and diseases of trees and shrubs. Most inquiries were received from rural areas of Saskatchewan, with the most common inquiries regarding spruce spider mite, yellow-headed spruce sawfly, woolly elm aphid, ash plant bug, spruce budworm and bronze birch borer.

2000 RESEARCH STUDIES

Evaluation of Insecticides for Control of Cottonwood Leafmining Beetle - The cottonwood leafmining beetle, *Zeugophora scutellaris* has the potential to reduce the annual growth of hybrid poplar stooling beds that are used for cutting production at the Shelterbelt Centre. On ornamental poplar, the mined leaves are unsightly and reduces the aesthetic value of the tree.

In 2000, Cygon 480E (dimethoate), Admire 240F (imidacloprid), Orthene T & O (acephate) and a water check were evaluated for the control of cottonwood leafmining beetle on Assiniboine and Walker poplar stooling beds located on the Shelterbelt Centre. Treatments were applied on July 27 with a hand gun attached to a high pressure sprayer at 480 kPa at a rate of 22 L of solution per 100 m² of plant surface area. A pre-treatment evaluation was conducted by randomly collecting 50 infested leaves from the trial area and recording the number of larvae per leaf, the size of each larvae and the size of each mined area. Assessment of the trial was conducted on July 31 by randomly collecting 20 infested leaves from each treatment plot and recording the same data as collected for the pre-treatment evaluation.

All three products reduced the cottonwood leafmining beetle population by 95 % compared to the water check. *NO phytotoxicity!*

Evaluation of Fungicides for the Prevention of Choke Cherry Leaf Spot - The Shelterbelt Centre produces and distributes approximately 350,000 choke cherry seedlings annually throughout the Prairies. This disease can cause complete defoliation of seedlings by mid-June, which results in reduced annual growth or even the death of seedlings. This trial was conducted to evaluate alternative products for the prevention of the disease and to reduce the potential of developing Benlate resistant strains of the fungus.

In 2000, Benlate 50WP (benomyl), Bravo 500 (chlorothalonil), Funginex 190 EC (triforine) and a water control check were evaluated for the prevention of choke cherry leaf spot on first year choke cherry seedlings. Treatments were applied five times during the growing season, May 5, May 25, June 28, July 17 and August 9, 2000. Treatments were applied with a horizontal boom delivering 565 L / ha through 8004 nozzles operating at 290 kPa. A visual assessment of choke cherry leaf spot was conducted on plants in each treatment plot on August 15. To determine the effect fungicide treatments had on choke cherry seedlings, four 30 cm samples were randomly selected from each treatment plot between August 21 and 23. The number of seedlings, the height of each seedling and weight of each seedling was recorded from each 30 cm sample.

The visual assessment rating of choke cherry leaf spot indicated that Benlate and Bravo treatments had less disease symptoms compared to the Funginex and water check treatments. Seedling survival was not significantly affected by fungicide treatment. Seedlings produced in the Benlate and Bravo treated plots were significantly taller and heavier than seedlings produced in the water check. Benlate was the most effective fungicide in preventing choke cherry leaf spot on first-year choke cherry seedlings. Bravo could be used as an alternative fungicide to reduce the potential development of Benlate resistant strains of choke cherry leaf spot.

Poplar Pest Survey - There has always been a high demand for hybrid poplar from the Shelterbelt Centre for use in farmyard shelterbelts. Recently there has been interest in using hybrid poplars for; carbon sequestration, oriented strand board lumber, and for value-added products such as hardwood flooring, paneling and furniture. In 1997 and 1998, the Shelterbelt Centre established hybrid poplar plantations at six sites in Saskatchewan. Each plantation was approximately six hectares in size and contained 10,000 hybrid poplars. In 2000, surveys were conducted three times at four of the sites to monitor insect, disease and environmental damage. Surveys were conducted at the plantations near Esterhazy, Birch Hills, Prince Albert and Meadow Lake. The surveys were conducted during the weeks of June 5, July 17 and September 4, 2000. During each survey, between 100 and 150 plants at each location were examined.

The most noticeable insect observed during the survey in 2000 was the gray willow leaf beetle (*Tricholochmaea decora*) which caused light to moderate damage at most of the poplar plantations. Other insects noted feeding included: numerous leafrollers (unidentified), several leafminers (*Zeugophora scutellaris* and *Phyllocnistis populiella*), cottonwood leaf beetle (*Chrysomela scripta*), flea beetles (unidentified), leaf-folding sawfly (*Phyllocolpa* nr. *agama*), white admiral (*Basilarchia arthemis*), willow sawfly (*Nematus ventralis*), poplar and willow borer (*Cryptorhynchus lapathi*) and grasshoppers (unidentified). These insects did not appear to reduce the vigour of the poplars in the four plantations monitored in 2000.

concerned re forest tent caterpillars
weeds were really the worst problems
not much re diseases & herbicide damage.

Handout
6

**RAPID CITY SERVICE CENTER, FOREST HEALTH MANAGEMENT
USDA FOREST SERVICE, ROCKY MOUNTAIN REGION (R-2)**

Report to the Great Plains Tree Pest Council Chadron, NE on April. 10 & 11, 2001

Staff: Kurt Allen - Leader/Entomologist
Vacant - Plant Pathologist
Joel McMillin - Entomologist
Dan Long - Forest Health Technician

Office: Black Hills National Forest
803 Soo San Drive
Rapid City, SD 57702
Ph: (605)343-1567
Fax: (605)343-7134

Service Area: All of South Dakota, except northwest corner; All of Nebraska; Northern Wyoming east of the Continental Divide (north of Casper and South of Pass City).

Summary of Rapid City Service Center 2000 – 2001 Work

Insects and Disease:

McMillin, J. D., K. E. Allen & J. L. Harris. 2000. Insect and disease conditions on the Bighorn National Forest. *USDA Forest Service, Region 2, Biological Evaluation RCSC-00-04*.

RCSC-01-01 – Aerial survey of insect and disease conditions, Black Hills National Forest

RCSC-01-02 – Aerial survey of insect and disease conditions, Shoshone National Forest

RCSC-01-03 – Monitoring of hail damage in northern Black Hills, Black Hills National Forest

RCSC-01-04 – Wood deterioration of fire-damaged pine, Black Hills National Forest

RCSC-01-05 – Aerial survey of insect and disease conditions, Bighorn National Forest

RCSC-00-01 – Insect and disease detection at Wind Cave National Park

RCSC-00-03 – Aerial survey of insect and disease conditions, Shoshone National Forest

RCSC-00-04 – Aerial survey of insect and disease conditions, Bighorn National Forest

Insects:

McMillin, J. D. & K. E. Allen. 2001. Evaluation of western balsam bark beetle fight periodicity in the Bighorn National Forest. *USDA Forest Service, Region 2, Biological Evaluation RCSC-01-02*.

McMillin, J. D. & K. E. Allen. 2001. Western balsam bark beetle impacts on spruce-fir forests of the Bighorn National Forest. *USDA Forest Service, Region 2, Technical Report R2-65*.

Allen, K. E. & J. D. McMillin. 2001. Evaluation of mountain pine beetle activity in the Black Hills National Forest. *USDA Forest Service, Region 2, Biological Evaluation RCSC-01-01.*

Allen, K.K. and McMillin, J.D. 2000. Evaluation of mountain pine beetle activity in Beaver Park on the Spearfish/Nemo Ranger District of the Black Hills National Forest. Bio. Eval. R2-00-01.

McMillin, J.D. and Allen, K.K. 2000. Evaluation of mountain pine beetle activity in the Black Hills National Forest. Bio. Eval. R2-00-03.

McMillin, J.D. and Allen, K.K. 2000. Impacts of Douglas-fir beetle on overstory and understory conditions of Douglas-fir stands, Shoshone National Forest, Wyoming. Tech. Rep. R2-64.

RCSC-01-06 – Forest Health Management bark beetle sampling, Black Hills National Forest

RCSC-01-07 – Forest Health Management bark beetle sampling, Bighorn National Forest

RCSC-00-13 – Douglas-fir beetle survey, Shoshone National Forest

RCSC-00-14 – Wood deterioration of fire-damaged pine, Black Hills National Forest

RCSC-00-15 – Douglas-fir beetle survey, Shoshone National Forest

RCSC-00-01 – Bark beetles in transplanted trees, Mount Rushmore National Park

RCSC-00-02 – Douglas-fir beetle in North Fork campgrounds, Shoshone National Forest

RCSC-00-05 – Forest Health Management bark beetle sampling, Bighorn National Forest

RCSC-00-06 – Forest Health Management bark beetle sampling, Black Hills National Forest

RCSC-00-10 – Survey for mountain pine beetle, Mount Rushmore National Monument

Disease:

Harris, J.L. 2000. White pine blister rust disease of limber pine in the Bighorn and Medicine Bow National Forests. Biol. Eval. R2-00-02.

RCSC-00-11 – *Phomopsis* history plot monitoring, Nebraska National Forest

RCSC-00-12 – Use of Basamid to control *Phomopsis*, Nebraska National Forest

Current Work at Rapid City Service Center

Insects and Diseases:

- Subalpine fir decline in spruce-fir forest type of the north-central Rocky Mountains
- Evaluation and monitoring of direct and indirect effects of hail damage to ponderosa pine stands on the Black Hills National Forest.

Insects:

- Gypsy moth detection trapping in recreation sites of national forest and parks in South Dakota and Wyoming
- Bark beetle sampling *Ips*, mountain pine beetle, Douglas-fir beetle, and western balsam bark beetle in the Black Hills, Bighorn, and Shoshone National Forests
- Role of subalpine fir blowdown in western balsam bark beetle population dynamics
- Interaction between fire-damaged ponderosa pine and insects ~~in~~ 3 regions of USFS
- Mountain pine beetle pheromone biology
- Use of verbenone and lethal trap trees in mountain pine beetle management
- Using MCH to prevent Douglas-fir beetle attacks

Diseases:

- Armillaria permanent plot re-measurements

Other Publications

Coyle, D. R., J. D. McMillin, R. B. Hall & E. R. Hart. Cottonwood leaf beetle (Coleoptera: Chrysomelidae) larval performance on eight *Populus* clones. *Environmental Entomology* (In press).

Coyle, D. R., J. D. McMillin, S. C. Krause & E. R. Hart. 2000. Laboratory and field evaluations of Novodor[®] and Raven[®] for control of the cottonwood leaf beetle (Coleoptera: Chrysomelidae). *Journal of Economic Entomology* 93: 713–720.

2000 Forest Health Summary North Dakota

Prepared by: Marcus Jackson

Declines and Renovation Efforts:

Windbreak Decline. As many of the windbreaks were established during the 1930's, it was understood that "once established (windbreaks) will not be perpetual, but will need care and renewal if they are to serve the purposes for which they were intended." In North Dakota, most of our windbreaks currently need some type of renovation effort. A windbreak renovation video will be released in May of 2001 to help conservation professionals and landowners explore ideas for renovation. Possibilities of Shelterbelt Planting in the Plains Region. 1935. USFS - The Lake States Forest Experiment Station. Pg. 10.

Aspen Decline. Lack of disturbance, especially fire, in North Dakota aspen stands has caused many of the native stands to become over-mature with little regeneration. Clear-cutting has been used in several wildlife management areas and on private lands in north-east and north-central North Dakota with good results.

Insects

Yellowheaded Spruce Sawfly. All native and introduced species of spruce grown in North Dakota are potential hosts to yellowheaded spruce sawflies. Many small to moderately aged spruce trees in the northern half of the state are lost each year to these insects.

Forest Tent Caterpillar. Small pockets of forest tent caterpillars (FTCs) have been consistently causing problems in North Dakota since 1997. Nearly all of these areas have been severely defoliated only once during the last four years. Basswood and aspen have generally been defoliated most (moderate to complete defoliation), while bur oak, boxelder, and green ash have usually been lightly defoliated. Most estimates predict FTC populations to collapse after 3 to 5 years. Parasitic flies are apparently important in the collapse of individual FTC pockets in North Dakota.

One area seen, not hit hard 2 years in a row.

Exotic Insect Threats:

Gypsy Moth. No gypsy moths were caught during the North Dakota 2000 trapping survey. We haven't had zero catches since 1996. Two moths (separate locations) were trapped during 1999 and one moth each year in 1998 and 1997. Each moth was caught in areas frequented by out of state visitors.

Asian Longhorned Beetle. Some of the Asian Longhorned Beetles (ALBs) favored hosts include trees that are native to the North Dakota (ex. boxelders, poplars, and elms). To help determine if any ALBs are present in the state, pictures of the insect are included in every extension forestry presentation reaching community foresters, arborists, extension agents, and others.

Diseases

Leaf Diseases. Moderately-cool, wet weather across much of North Dakota early in the growing season of the last three years has helped many leaf diseases thrive. Ash anthracnose caused significant defoliation of green ash in parts of eastern, central, and southwestern North Dakota over the last three years. Apple scab caused significant defoliation of crabapple trees across North Dakota during 1999 and 2000. Various leaf diseases of *Populus* sp., including *Marssonina* spp., *Melampsora medusae*, and *Septoria musiva* appear to have increased in severity over the last several years.

Sphaeropsis Shoot Blight. Towner State Nursery supplied more than 270,000 pine trees for conservation plantings in North Dakota and other Great Plains states and Canadian provinces in 1999. A 2000 survey of the nursery found that 26 of the 32 Ponderosa pine windbreaks in the nursery showed symptoms of Sphaeropsis shoot blight. Percent of trees affected in each windbreak ranged from 1% to 78%. A management plan for the disease at the nursery includes annual monitoring of disease levels, a systematic removal and replacement of Ponderosa pine windbreaks, locating Ponderosa pine crops in fields with minimal exposure to the disease, and possible preventive fungicide applications to prevent infection of nursery crops .

Dutch Elm Disease. Since Dutch Elm Disease (DED) has spread to all of the major stands of native elms in North Dakota, efforts to slow the impact of the disease has moved primarily to community trees. In many small communities and windbreaks, elms continued to be lost quickly after DED was detected in those areas.

Ash Yellows. Recent research has shown that ash yellows phytoplasmas are present in ash all over central North America. Currently, we do not know if ash yellows causes significant damage in North Dakota.

Publication:

Jackson, M.B., Glogoza, P.A., Knodel, J.J., Ruby, C.L., and Walla, J.A. Insect and Disease Management Guide for Woody Plants in North Dakota. 2000. NDSU Extension Publication F-1192. 40 pp. ↳ No photos; will build it on the website

Forest Health Monitoring in North Dakota:

North Dakota will be involved with the FIA/FHM plots by fulfilling basic state responsibilities in 2001 and will consider taking on additional responsibilities in future years. We will assist with data analysis and participate in meetings which are critical to accomplishing FIA/FHM goals in North Dakota. North Dakota will probably provide one person to help collect data on the P3 plots in our state.

We are considering the development of a new Forest Health Specialist position to help with forest health monitoring, surveys, insect and disease diagnosis and management recommendations. This person would work with an FIA field sampling crew to provide plot and off-plot information on forest health, vegetation, woody debris, soils and ozone bioindicators and would assist in analysis and development of reports associated with the FHM program.

handout
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Report to Great Plains Tree Pest Council

April 10-11, 2001
Chadron, Nebraska

Mark Harrell and Laurie Stepanek
Nebraska Forest Service, University of Nebraska
and
Loren Giesler, Dept. of Plant Pathology, University of Nebraska

Pine wilt

Large numbers of Scotch pines are now being killed annually by pine wilt in the southeastern corner of Nebraska. This problem caused the Nebraska Forest Service earlier this year to no longer recommend Scotch pine for permanent plantings in the area south of a line from Lincoln to Plattsmouth.

Surveys for the pine wood nematode, the cause of pine wilt, have confirmed the presence of the nematode in many areas of the state beyond the southeastern corner, including forests near Halsey, Valentine, and Chadron; a windbreak about 40 mi. north of North Platte; and in the city of North Platte. The nematode has been isolated over the last few years from dead Scotch, Austrian, ponderosa, and jack pines and is assumed to be present in the state wherever pines are common. The nematode seems to cause disease only or mostly in Scotch and Austrian pines. Ponderosa pine and jack pine seem to be resistant to the nematode and are typically not killed by it.

Recommendations for controlling pine wilt during the spring and summer months are to remove and destroy pines killed by the disease as soon as possible. These trees should be burned, buried, or chipped to reduce the chance that the pine sawyer beetles will emerge and carry the nematodes to new trees. Since the beetles are typically not present outside the trees from October through the middle of May, trees discovered with pine wilt after the first of October do not need to be removed and destroyed until the first of May.

The technique that has worked best for us for sampling for nematodes in standing trees has been to take 1- to 2-inch-long increment borer cores from about eight widely separated locations. The cores are immediately put into vials of distilled water, and the water is checked for nematodes after several hours or the next day. If an increment borer is not available, or only a small stem section is available for sampling, then chips of wood taken at several locations with a mallet and chisel are used instead of the cores. When nematodes are found in the water, they are checked to determine if they are *Bursaphelenchus xylophilus*, because other nematode species can be present as well. Diagrams used to identify nematode species can be found in the publication: Tarjan, A.C. and C.B. Aragon; 1982; An analysis of the genus *Bursaphelenchus* Fuchs, 1937; *Nematropica* 12(1):121-144.

For 2001 and beyond, plans are being made for studies to more clearly identify times of the year when beetles are likely to spread the nematodes and to try to determine how serious the disease will become in areas of the state beyond the southeastern corner. The plans include trapping and caging beetles to identify the species and life cycles, inoculation tests to see if different populations of nematodes differ in their ability to cause disease, and examinations of Scotch pines across the state to see if initial tree health affects the likelihood that disease will develop.

Winter injury

Two aspects of the winter of 2000-2001 have caused widespread browning of foliage of pines, spruces, and other evergreens across the state. A freeze injury occurred October 8, 2000, when temperatures in eastern Nebraska dropped to 16° F. Foliage on affected trees turned brown in January and February when milder temperatures returned. The relatively warm temperatures in January and February also caused a significant amount of drying injury on pines and other evergreens that had gone into the winter fairly dry from two years of drought. These trees also turned brown.

In many cases the cause of the problem could be determined by considering the shade of the brown color and where it was located on the tree. The freeze injury typically caused an orangish brown color that was heaviest on the southwest side of the tree. The drying injury caused a more straw-brown color of foliage that was either over most of the tree or was primarily at the top of the tree. It is not known yet how serious either kind of damage will be to the trees.

White pine mortality

Many white pines have died suddenly in southeastern Nebraska over the past several years. This was especially common in the fall and winter of 1999-2000, but mortality has occurred in summer months as well. The problem has affected trees from about five years old to nearly mature, and sites have ranged from urban landscapes to Christmas tree plantations. Trees typically have good growth rates, but then turn brown and die within one to two months.

Affected trees often have significant amounts of resin on the bark near the base of the tree. The resin and foliar symptoms are similar to what is described for *Procera* root disease, but attempts to isolate the fungus have been unsuccessful. The problem seems to occur also in Iowa, and no cause for the problem has been identified there either.

Pales weevil

Pales weevil was identified in a Christmas tree planting near Lincoln. Young Scotch pines that had been defoliated by sawflies were heavily scarred by adult weevil feeding. Several seedlings were killed. Flagging was seen on market-size Scotch and eastern white pines. Pales weevil is known to carry the *Procera* root disease fungus, which may be responsible for the unexplained white pine mortality observed in this planting.

Cercospora blight control test

Cercospora blight of juniper and redcedar is a serious problem for these trees in the eastern half of Nebraska. Tenn-Cop had been the fungicide most commonly used to control this disease, but the label for uses on trees was changed to the new name Camelot, and the price was increased so much that it became expensive to use and very difficult to obtain.

In 1999 a preliminary test of the copper fungicide Champ was initiated to try to find an economical alternative to Camelot. Champ had been used by an arborist in central Nebraska for a couple of years and had seemed effective in controlling *Cercospora* blight. In the fall of 2000, after two years of treating parts of two windbreaks and leaving parts of the two windbreaks untreated, it seemed the Champ treatments had provided some degree of protection to the trees. A more extensive test of this product is planned for 2001 and 2002.

Humidity trend

As part of an attempt to explain why *Cercospora* blight has become a serious problem in recent years, we examined relative humidity data for the summer months at six locations across Nebraska for the past 16 to 19 years. Trends show an increase in relative humidity has occurred in central and eastern Nebraska during this time, while no change has occurred in the western part of the state. It seems likely that the increase in summer humidity could increase the severity of certain diseases, and this may be part of the reason for the increased problem with *Cercospora* blight.

Ash anthracnose

An Autumn Purple Ash trial was set up to evaluate fungicide application for management of a suspected *Botryodiplodia* dieback problem. After following the trees for one year and missing the window of treatment for anthracnose early in the season, it was concluded that the problem was due to anthracnose and not *Botryodiplodia*. In the nursery where these trees are being produced, near Omaha, NE, most of the trees have lost their leaders due to this problem. Fairly severe anthracnose foliar symptoms were observed in the study. Studies are planned in 2001 to evaluate anthracnose management on these trees and the impact it has on overall tree growth and leader development.

Plant & Pest Diagnostic Clinic samples

Two hundred sixty-four samples of trees and woody ornamentals were examined by the diagnostic clinic in 2000. Of those, 20% had disease problems, 40% had insect problems, 30% were environmental, and 10% had no problem. Individually, the greatest number of problems diagnosed were drought stress (15%), Fletcher scale (8%), pine wood nematode (5%), spruce spider mite (5%), winged euonymus scale (5%), and chemical injury (4%).

New Publications

- Giesler, L.J. 2000. Sphaeropsis tip blight of pines. Univ. Nebr. Coop. Ext. NebGuide G83-646-A, 4 p.
- Giesler, L.J. and M.O. Harrell. 2000. Pine wilt in Nebraska. Univ. Nebr. Coop. Ext. NebFact NF00-448, 1 p.
- Gleason, M., M. Linit, N. Zriba, P. Donald, N. Tisserat, and L. Giesler. 2000. Pine wilt: A fatal disease of exotic pines in the Midwest. Univ. Nebr. Coop. Ext. EC00-1878, 8 p.
- Stepanek, L.J. and M.O. Harrell. 2000. Mortality of seedling windbreak trees caused by a common sunflower insect *Isophrictis similiella* (Chambers) (Lepidoptera: Gelechiidae). J. Kans. Entomol. Soc. 73(2):123-125.
- Stepanek, L.J., J.R. Brandle, and M.O. Harrell. 2001. Assessment of microenvironmental conditions related to the use of synthetic sheet mulches for protecting newly planted trees in semi-arid environments. J. Sustainable Agriculture, in press.

2000 NEBRASKA DEPARTMENT OF AGRICULTURE PEST SUMMARY & REPORT

It's a small world after all! Sources of Nebraska nursery stock come from not only the United States, but Canada, The Netherlands, and Costa Rica to name a few. All sources of nursery stock must be reported on the Growers or Dealers application. Our department uses this information to trace back pest outbreaks associated with imported nursery stock. The Federal & State Plant Quarantine Summaries is now available on the web. The URL is: <http://www.aphis.usda.gov/npb/F&SQS/sqs.html>. The manual is also available from the American Nursery and Landscape Association at (202) 789-2900.

Japanese beetle eradication efforts will be occurring in two locations in the Omaha area in 2001, resulting from infested B&B nursery stock. Make certain to purchase nursery stock only from firms that have been certified under the Japanese Beetle Harmonization Plan found at <http://www.aphis.usda.gov/npb/jbintro.html>.

Gypsy moth egg masses were detected on a spruce tree at one Omaha nursery and multiple trap catches occurred around this site in July. In December 2000, Christmas trees were found infested with gypsy moth egg masses at a Christmas tree lot in Omaha. Over 1,400 traps were placed statewide, concentrating on high-risk areas. A USDA infestation map may be found at <http://www.aphis.usda.gov/ppq/maps> and Forest Service Pest Alert at http://www.na.fs.fed.us/spfo/pubs/pest_al/gypsymoth/gypsymoth.htm.

Pine shoot beetle continues to expand its range in the Lake States. Pine nursery stock and Christmas trees are regulated from infested areas. Our department placed pheromone traps across the state and inspected pine growers and Christmas tree lots for this insect, with nothing found in 2000. Information and distribution in the U.S and Canada is at <http://www.cfia-acia.agr.ca/english/ppc/science/pps/datasheets/tompine.shtml> and <http://www.cfia-acia.agr.ca/english/plaveg/protect/dir/psbe.shtml>.

Asian long horned beetle surveys in Nebraska were negative for 2000; some warehouse areas in Omaha were surveyed. Be on the lookout for this large beetle. Information and updates on the eradication programs in New York City and Chicago can be found at <http://www.na.fs.fed.us/spfo/alb/index.htm>.

Imported fire ant expanded its range to California and eradication in that state is an uphill battle. Imported fire ants can come in on nursery stock from infested areas. If ants are biting nursery workers, give us a call. See distribution at <http://www.aphis.usda.gov/ppq/maps> and how ants act in the nursery at http://www.cahe.nmsu.edu/pubs/_g/G-321.html.

Daylily rust is a new disease for 2001. It has been detected in the southeastern United States. UNL has a NebFact on this disease. Information can also be found at <http://www.aphis.usda.gov/npb/daylily.html>. Be very careful and make certain that your source of daylilies and *Patrinia* spp are from certified sources and found to be rust-free.

Chrysanthemum white rust was detected in Washington state and British Columbia this year. Find out more about this disease of chrysanthemums at <http://www.pestalert.org/Detail.CFM?recordID=18>.

Brown spruce longhorn beetle was discovered in Halifax, Nova Scotia, Canada in 1999. Eradication is under way. It appears to have been imported from China. Canadian information about eradication efforts can be found at <http://www.pestalert.org/Detail.CFM?recordID=11>.

Plum Pox was detected in the United States for the first time in 1999 and Canada in 2000. A huge eradication program has been going on in Pennsylvania. Plum, peaches and stone fruits are at risk. Plum pox site is at <http://www.aphis.usda.gov/ppq/plumpox>. Virus indexing programs are critical to insure clean nursery stock.

Pine wilt nematode has expanded its range in Nebraska. Scotch pine is at risk. Mark Harrell, UNL, has been tracking this problem. Site information is at <http://ianrwww.unl.edu/pubs/plantdisease/nf448.htm>.

Canada thistle was found in B&B nursery stock many times in 2000 and that nursery stock was withdrawn from distribution. **Purple looserstrife** is now a Nebraska noxious weed and can't be distributed in the state.

**NEBRASKA DEPARTMENT OF AGRICULTURE
2000 ANNUAL REPORT**

By
Stephen V. Johnson, State Entomologist
Vicki Wohlers, Nursery Inspector

Nursery Stock Inspections & Certifications:

Acres of nursery stock inspected	2,078
Nursery stock grower licenses issued	329
Dealer locations inspected	392
Nursery dealer licenses issued	556
Nursery broker licenses issued	1

Phytosanitary Export Inspections & Certifications:

Federal phytosanitary certificates issued	2,739
State phytosanitary certificates issued	98
Processed product certificates issued.....	45
Re-Export certificates issued	4
Acres of seed corn fields inspected.	42,736
Number of seed corn fields inspected.....	520
Acres of popcorn seed fields inspected.....	10
Number of popcorn seed fields inspected.....	3
Acres of wheat seed fields inspected	6
Number of wheat seed fields inspected.....	1
Acres of soybean seed fields inspected.....	38
Number of soybean seed fields inspected	4
Acres of sorghum seed fields inspected.....	18
Number of sorghum seed fields inspected	6
Acres of pearl millet seed fields inspected	2
Number of pearl millet seed fields inspected.	1

European Corn Borer Quarantine & Certifications:

Firms under compliance agreements.....	185
Shipments made.. ..	3,800

Surveys - Gypsy Moth (GM); Japanese Beetle (JB); Pine Shoot Beetle (PSB); Karnal Bunt (KB); Cereal Leaf Beetle (CLB); and Stewart's Wilt (SW):

GM - Traps used.	1,415
Male moths captured	22
Total number of positive traps.....	12
Number of multiple trap catches of the total	2
Number of counties where positive traps occurred	6
JB - Traps used... ..	110
Beetles captured	1605
Number of counties surveyed.....	20
Number of counties where positive traps occurred	4
PSB -Number of pheromone traps set	10

Number of counties trapped	8
Number of growers of nursery stock surveyed	189
Number of counties of growers surveyed	59
Number of retail Christmas tree lots surveyed	102
Number of counties of Christmas tree lots surveyed	18
Number of positive counties.....	0
KB - Number of samples collected.	40
Number of counties surveyed.....	29
Number of positive counties.....	0
SW - Number of fields surveyed	523
Number of counties surveyed.....	27
Number of positive fields	207
Number of positive counties.....	24

Apiary Statistics:

Number of apiaries registered.....	1,854
Number of colonies registered.....	40,766
Entry permits issued	21
Colonies entering Nebraska.....	24,088
Colonies certified to leave Nebraska	11,510
Number of registered beekeepers ...	258
Number of apiaries inspected	177
Number of colonies with American foulbrood	47
Number of colonies with European foulbrood.....	6
Number of colonies with chalkbrood.....	58

Nursery Grower Inspections

The Nebraska Department of Agriculture (NDA) licensed 329 nursery growers in 2000, totaling 2,078 acres of nursery stock. This is an increase of 20 growers (and 175 acres) from 1999. The nursery inspection computer program was converted over to Microsoft Access 2000 and developed in-house. A statistical breakdown of pest problems is listed at the end of this report.

Nursery Dealer Inspections

The NDA licensed 556 nursery dealers and one nursery broker in 2000. This is an increase of 25 nursery dealers from 1999.

During the spring (May and June) and fall (September) of 2000, 392 dealer inspections were conducted as compared to 352 dealer inspections conducted in 1999. These inspections resulted in 182 Withdrawal-From-Distribution orders (as compared to 188 Withdrawal-From-Distribution orders in 1999). More than 5,391 plants were withdrawn from distribution due to disease problems, insect problems, being non-viable, or having environmental, mechanical, or noxious weed problems (as compared to 8,133 plants in 1999).

Disease problems included rose mosaic virus, tobacco rattle virus, crown gall, cankers, and fireblight to name a few. Insect problems included winged euonymus scale, fletcher scale, black vine weevil, Zimmerman pine moth, borers, various scales, Taxus mealybug, and spruce weevils (*Barypeithes pelluoidus* and *Polydrysus impressifrons*) to name a few.

Dealers were informed about requirements for source labeling. Nebraska law does require that nursery stock be labeled as per botanical name and growing origin. Inspectors also kept track of the names of aquatic plants being offered for distribution.

Because Nebraska is a protected state concerning Quarantine 38 (Black Stem Rust/Barberry Quarantine), NDA inspectors kept track of the barberry varieties each dealer location was carrying. No rust-susceptible barberry varieties were found.

A total of 94 Rejection Notices were issued to the following states and Canada for the listed violations:

Canada (7) Fletcher scale, black vine weevil
Connecticut (1) Black vine weevil
Illinois (10) Fletcher scale, Taxus mealybug, Canada thistle
Iowa (1) Fletcher scale
Michigan (37) Fletcher scale, Winged euonymus scale, rose mosaic virus, black vine weevil, crown gall
Minnesota (4) Fletcher scale
Missouri (1) Fletcher scale
New York (1) Winged euonymus scale
Ohio (6) Fletcher scale, winged euonymus scale
Oklahoma (5) Fletcher scale, winged euonymus scale
Oregon (12) Fletcher scale, black vine weevil, Taxus mealybug, *Barypeithes pellucidus* weevils
Texas (1) Black vine weevil
Utah (2) Fletcher scale
Washington (1) Canada thistle
Wisconsin (5) Fletcher scale, Zimmerman pine moth, *Polydrysus impressifrons* weevils, Canada thistle

Field Inspections

The Nebraska Crop Improvement Association (NCIA) cooperated with the NDA to conduct field inspections for firms exporting seeds. NDA inspectors were responsible for inspecting nursery fields, while crop improvement inspectors inspected the remaining production fields.

The following are statistics concerning 2000 field inspections for firms exporting seeds:

NUMBER OF FIELDS	CROP	TOTAL ACRES
520	Corn	42736
1	Pearl Millet	2
3	Popcorn	10
6	Sorghum	18
4	Soybeans	38
1	Wheat	6
Totals 535		42810

Export Certification

Phytosanitary certificates are issued to firms exporting plants and plant products. From January to December 2000, a total of 2,886 phytosanitary certificates (2,739 federal, 98 state, 4 re-export, and 45 processed product) were issued. This is an increase of 371 certificates from 1999.

Gypsy Moth Survey

The Nebraska Plant Pest Advisory Committee was established in 2000. This seven-member committee's purpose is to review the threat to Nebraska of non-indigenous invasive plant pests. They will authorize and facilitate the Cooperative Gypsy Moth Program in the state of Nebraska and act as a liaison between the Cooperative Gypsy Moth Program, the Governor, and the State Legislature. The Nebraska Gypsy Moth Management Plan was officially approved by this committee for 2000.

A total of 1,415 gypsy moth traps (1,169 detection and 246 delimiting traps) were set in Nebraska in 2000 by NDA and USDA/APHIS/PPQ. Delimiting trapping programs were conducted in the cities of Omaha (Douglas County), Papillion (Sarpy County), Lincoln (Lancaster County), Minden (Kearney County), and St. Paul (Howard County) this year.

One of the original 13 special trapping blocks established in the Omaha area in 1994 was delimited in 2000. These original 13 blocks were established because of gypsy moth infested spruce trees received from Vern Johnson and Sons, LeRoy, Michigan; and Zelenka Nursery, Grand Haven, Michigan, planted in 1994 and 1995. Four new delimiting blocks were established in Omaha in 2000 due to positive trap catches in 1999 and infested nursery stock from Strathmeyer Forests in Pennsylvania. The rest of the Omaha metro area was trapped at the rate of one trap per square mile.

A fresh, viable gypsy moth egg mass, mature larval skin, and pupal skin were collected from an 8' B & B Black Hills Spruce from Central Wisconsin Evergreens, Wisconsin at an Omaha nursery. This was discovered after moth flight and could have originated from another nursery stock source.

We have trapped a total of 22 gypsy moths in 12 gypsy moth traps (one delimiting trap had 10 moths and one detection trap had two moths with the remaining 10 traps being single moth catches). The counties involved are Douglas, Sarpy, Nance, Lancaster, Dodge, and Buffalo. This is an increase of 13 gypsy moths trapped from 1999.

Japanese Beetle Survey

A total of 110 Japanese beetle traps were placed in 20 counties in Nebraska during 2000, with emphasis on rest stops, nurseries, airports, and railyards. The rest area located at Interstate 80 and Highway 77 north (near Lincoln) has been declared eradicated of Japanese beetle. We will continue to place one trap at that location each year.

Positive Japanese beetle finds include:

COUNTY	LOCATION	NUMBER OF BEETLES
Douglas	4 Dealers	410
Douglas	5 Growers	1050
Lancaster	2 Dealers	24
Lancaster	3 Growers	56
Dodge	1 Dealer	42
Sarpy	2 Dealers	21
Sarpy	1 Grower	2
GRAND TOTAL	18 Locations	1605

There was an increase of 946 Japanese beetles trapped in 2000: 1605 total beetles trapped in 2000, as compared to 659 total beetles trapped in 1999.

Soil sampling on B & B stock was conducted in April at some nursery dealers to verify freedom from Japanese beetle grubs.

CAPS Surveys

Surveys conducted by the Nebraska Department of Agriculture this year included:

1. Karnal bunt survey - A total of 40 wheat samples were collected in 2000 from grain elevators in 29 counties. Samples were processed and identified by the Karnal Bunt Laboratory at the Kansas Department of Agriculture. Results were all negative.
2. Stewart's wilt survey - A total of 523 fields (42,737 acres) in 27 counties were surveyed for Stewart's wilt. Stewart's wilt was positive in 207 fields in 24 counties in 2000. This is a substantial increase as there were only 47 fields in 13 counties in 1999.
3. Pine shoot beetle - Pine shoot beetle pheromone traps were set at 10 sites in eight counties. All traps were negative. Visual surveys were conducted at 189 nursery growers in 59 counties statewide during regular growing season inspections. All surveys were negative. Christmas tree lots carrying imported Christmas trees were surveyed in November and December.
4. Water plant and aquatic plant survey - Inspectors kept track of which dealers and growers distribute water plants as well as which plants were being distributed.
5. Historic insect county records database - The University of Nebraska Department of Entomology developed a Microsoft Access database for historic insect county records in our state. This database information originated from the old county record card files. The first records date back to 1891 with 38,086 records in the database and will be accessible on the Internet.

Other Surveys

1. Asian longhorned beetle - surveys were conducted in some locations as follow-ups to USDA/APHIS notifications of potentially infested wood packing material. Surveys were all negative.
2. Soybean aphid - soybean fields were surveyed in September for this new soybean pest. Surveys were all negative.
3. Artificial Christmas trees - artificial Christmas trees from China were surveyed in conjunction with USDA/APHIS at some locations. Surveys were all negative.

Program Changes, New Personnel

We once again utilized temporary summer employees to cover nursery dealer and grower inspections as well as helping with some of the survey programs such as Japanese beetle, gypsy moth, and pine shoot beetle. Jim Huser and Jennifer Geranis returned again this year and covered the Omaha area. Jeff Carstens was newly hired in 2000 and covered the Lincoln area. Cellular phones were utilized so they could stay in touch with Vicki Wohlers and Steve Johnson.

Purple loosestrife (*Lythrum salicaria* and *L. virgatum*) was put on the Nebraska noxious weed list. Effective January 2001, it will be illegal to sell or distribute purple loosestrife in Nebraska.

Microsoft Office was purchased this year and Access 2000 is being utilized as a relational database for our nursery certification program, survey programs, growing season field (phytosanitary) inspections, and European corn borer program. This is all being developed in-house.

Charlie Simonds, apiary inspector with our department, is retiring in August 2001. We are proposing changes to the Nebraska Apiary Act contained in LB 436 that will drop the requirement to obtain a health certificate for honey bees moving in and out of Nebraska. This position will be utilized as a basis for hiring a new nursery inspector for the Omaha area.

Top Ten Insects and Diseases in Nursery Growers for 2000

Insects

1. Zimmerman pine moth
2. Borers (bronze birch, cottonwood, flatheaded appletree, iris, ash/lilac, honeylocust, oak clearwing, peachtree, and unspecified)
3. Scale (pine needle, euonymus, oystershell, brown soft, cottony maple, and unspecified)
4. Aphids (birch, woolly hawthorn, woolly apple, water lily, ash leaf curl, and unspecified)
5. Galls (elm cockscomb, noxious oak, oak petiole, jewel oak, oak bullet, woolly oak, hackberry nipple, hackberry blister, hackberry petiole, ash flowergall, maple bladdergall, and unspecified)
6. Ash plant bug
7. Lacebug
8. Leafhoppers
9. Mimosa webworm
10. Spider mites

Diseases

1. Dothistroma needle blight
2. Leaf spots (various species)
3. Micoplasm-like organisms (MLO)
4. Black knot
5. Cankers (various species)
6. Brown spot
7. Cedar apple rust
8. Hawthorn rust
9. Quince rust
10. Powdery mildew

Noxious Weed Problems Found

1. Musk thistle
2. Canada thistle
3. Bindweed
4. Plumeless thistle

Other Miscellaneous Problems

1. Trunk damage
2. Nonviable
3. Dead tops/crowns
4. Rabbit damage
5. Herbicide damage
6. Environmental damage
7. Iron chlorosis
8. Deer damage
9. Leaf scorch
10. Sunscald

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IOWA'S FOREST HEALTH MONITORING AND MANAGEMENT

BACKGROUND: Our forests are vital to our state's future. Iowa's forests have a great impact on our agricultural-based economy and protection of our drinking water supply. Trees in our small and large communities, our "urban forests," increase property values while conserving both cooling and heating energy. They are also critical for wildlife habitat and overall enjoyment of the place we call Iowa. Trees and forests cover over 2.1 million acres of the state, producing a beautiful landscape for residents and visitors. Over 7,000 Iowans are employed in producing lumber and high quality wood products.

Iowa forest health issues that affect private and public forest resources are given attention by the Forestry Services Bureau of the IDNR - Division of Forests and Prairies (DNR). The Forestry Services Bureau provides technical monitoring and direct assistance to Iowa's woodland areas. Stewardship, Urban Forestry, Rural Development through Forestry and State Forest Management are all ways in which the Forest Health Program is integrated. The Forest Health Program is coordinated by the Bureau Chief, the Webster City District Forester who coordinates field work, 11 remaining district field and 3 assistant district foresters. The Forestry Services Bureau assumes responsibility for all program activities and maintains close ties to the Department of Entomology at Iowa State University, State Entomologist of IDALS and the USDA Forest Service Forest Health Unit at St. Paul, MN.

Iowa DNR Division of Forests and Prairies began monitoring forest and tree health conditions around the state in the late 1970's. The Division knows that the citizens of Iowa value their forest resources and responds to their needs. Today, this monitoring effort is used to determine overall forest and tree health conditions, including the status of natural and exotic insect, disease and plant problems. The forest health programs are effective in providing up-to-date information for private and public managers to aid in the sustained management of Iowa's forest resources.

PROGRAM IMPLEMENTATION: In cooperation with the Iowa State Entomologist Office, the Division coordinates a Forest Insect and Disease Management Council of other organization and agencies involved in forest health activities in Iowa. This group organized and coordinated the North Central Forest Pest Workshop in Dubuque, Iowa, in September 1998, hosting 100 professionals. The Council doubles as the Gypsy Moth Advisory Committee to the State Entomologists with the Iowa Department of Agriculture and Land Stewardship (IDALS). Through aerial surveys of over 278,000 acres per year and visual reports from DNR Foresters and Municipal foresters, the Forestry Services Bureau compiles data necessary for an annual Forest Health Report. The State Forests Bureau conducts Gypsy moth monitoring on Yellow River State Forest. Recently, Iowa began assisting the USDA Forest Service in collecting field data for the Forest Health Monitoring Program. The Division produces an Annual State Report on Forest Health.

STATE AND PRIVATE COOPERATIVE FEDERAL FUNDING:

State Fiscal Year	FY01	FY00	FY99	FY98	FY97	FY96	FY95
USFS Forest Health Funds	\$59,700	\$27,279	\$21,300	\$21,500	\$21,500	\$21,000	\$26,000

ACCOMPLISHMENTS:

- ✓ Placed and monitored 150 Gypsy moth survey traps at Yellow River State Forests and participated in Gypsy moth public meetings and egg mass surveys in NE Iowa.
- ✓ Coordinated a volunteer Gypsy moth survey program working with over 350 people statewide.
- ✓ District foresters provided 1,247 forest insect and disease management assists to Iowa forest landowners during FY00.
- ✓ Provided Storm Damage Assistance to the Iowa Emergency Management Division during the early snow storms, tornadoes and 100 mph straight winds that damaged urban trees/forests in Central and Eastern Iowa.
- ✓ Hazard Tree Training programs were provided at two Community Tree Steward Programs, and during three Tree Worker Training workshops for Municipal Utility workers.
- ✓ In 1998/99, completed the FY97 focus funding project--Scattered Oak Wilt Control Trials. DNR staff assisted in collecting field data and work of researchers.
- ✓ Aerial sketch mapped between 278,000 acres of Iowa's forests for oak wilt and other forest health issues.
- ✓ Since 1993, the Forestry Division has produced a brochure-type Forest Health Report for distribution to conservation agencies, businesses, and citizens.
- ✓ Coordinated completion of Focus Funding Projects on ash yellows (2), hard maple decline, Nitidulid beetles and scattered Oak Wilt control with Iowa State University and the University of Minnesota.
- ✓ Co-chair a Invasive Species Working group looking at ways to increase awareness and management efforts of invasive species in forest, wetland, prairie and waterways.
- ✓ Began annual implementation of the USFS's Forest Health Monitoring program through training and fixed plot measurements.
- ✓ Recently signed a MOU with Iowa State University Department of Entomology to provide additional technical assistance.

Issues and Needs:

- ✓ Invasive insects, diseases and plants impacting woodlands.
- ✓ Impacts of natural disasters on woodlands, such as storms, floods and tornadoes

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Iowa's Forest Health Report 2000

Why worry about Iowa's forest health?

Between 2-2½ million acres of Iowa is covered by trees and forests (6 percent of the landcover). Iowa's forests and trees are largely controlled by private ownership (92%). Our forests have significant impacts on Iowa's agricultural based economy by protecting water quality, providing wildlife habitat and numerous outdoor recreational opportunities. Wood/forest products industries in Iowa employ over 7,000 people, producing lumber and high quality wood products. Trees in our small and large communities or "urban forests" increase property values and conserve cooling and heating energy. Our forests are vital to our state's environmental future.

or floodplain forests (137,944 acres). Visual surveys from DNR foresters along with trained master woodland managers and community tree stewards ground checked forest health problems and locations. The "gypsy moth" *Lymantria dispar* a potentially serious, exotic defoliator of Iowa's native trees and shrubs is monitored through the leadership of the State Entomologist, who placed over 7,000 pheromone survey traps across the state. The purpose of the trap setting was twofold: to determine possible infestations and locate sites in need of control efforts. The DNR coordinated gypsy moth survey efforts at Yellow River State Forest (150 traps over 8,000 acres) and a statewide volunteer monitoring effort with over 360 trained community tree stewards.

Main Forest Types of Iowa

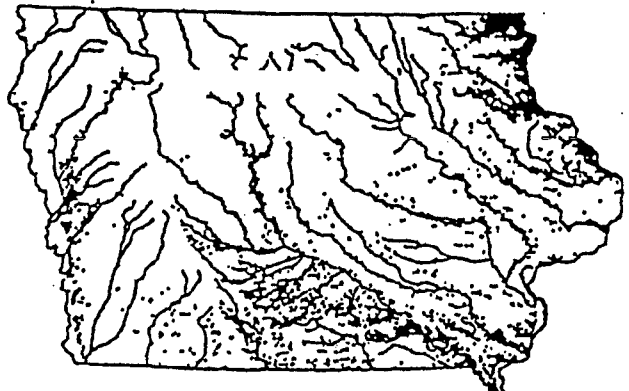
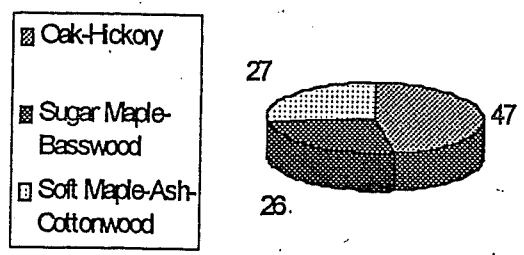


Figure 2. Iowa's Forests are located on areas often too steep and too wet to Farm

Forest health monitoring efforts are cooperative efforts with the DNR through the USDA Forest Service, USDA Plant Protection Quarantine, State Entomologist of the Iowa Department of Agriculture and Land Stewardship and Iowa State University, along with private/public foresters and private landowners. This cooperative effort encourages efficient monitoring efforts and fosters communication with those involved in Iowa's forests and their future health.

Monitoring Efforts for 2000

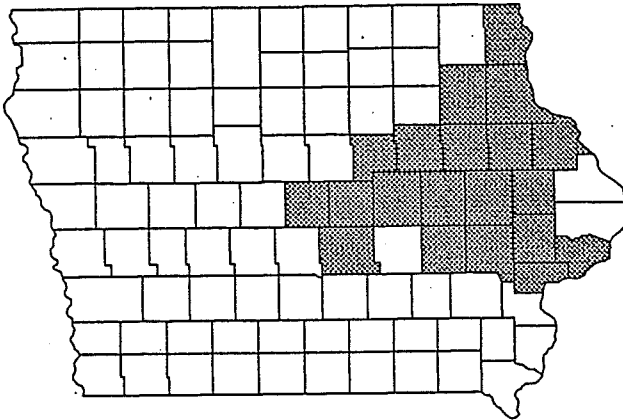
Estimates of serious forest and tree insect and disease, and severe weather impacts, were determined by aerial surveys of over 279,831 acres of upland forests (141,887 acres) and bottomland

During the summer of 2000, DNR foresters conducted aerial surveys of 279,831 forested acres of the major river valleys of Iowa: Des Moines River, Cedar River, Iowa River, Mississippi River and the Upper Iowa River. Surveys were conducted at this time to determine the extent of oak wilt, Dutch elm disease and impacts of severe weather. Visual and verbal reports from community tree stewards and foresters were also used during the growing season to determine areas of significant impact.

Weather Impacts

The winter and spring of 2000 were rather mild throughout the state, with snow fall below normal and temperatures above normal. Leaf flush of deciduous trees occurred in mid to late April. There were isolated reports in eastern Iowa of tattered leaves of several species of oaks. Tattered leaves is considered a symptom of late spring frost or aerial drift of agricultural herbicides. Impacts of "tatters" on individual trees is still not clear. Documented herbicide drift impacted over 42 acres in 2000.

Reports of Tatters per county 2000



While the majority of the state enjoyed mild temperatures, parts of northeastern Iowa were receiving excessive amounts of precipitation, resulting in flooding. The DNR estimates that 245 acres of forest were significantly impacted by flooding along the Cedar and upper portions of the Mississippi Rivers. At the other extreme, much of the southern half of Iowa experienced drought conditions, causing some mortality of recently established plantings and early leaf drop of many species. In fact, portions of southern Iowa are currently experiencing severe water shortages that, if it continues, could impact future forest and tree resource needs. Severe weather, in the forms of thunderstorms and tornadoes, caused extensive damage during early September in the communities of Davenport and Dubuque. Parts of eastern Iowa forests documented over 300 acres of blowdown from severe weather during the course of 2000.

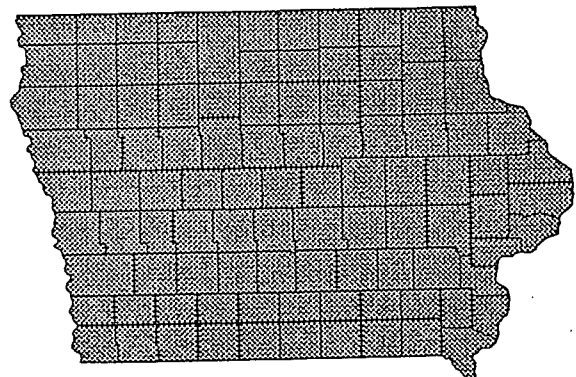
The year 2000 was a year of plentiful seed and

fruit production across the state, from fruit trees to timbered areas. Abundant crops of all species of acorns and walnuts were noted across the state. Early and record amounts of snowfall, along with bitter cold temperatures and windchills, during December statewide closed out the year 2000.

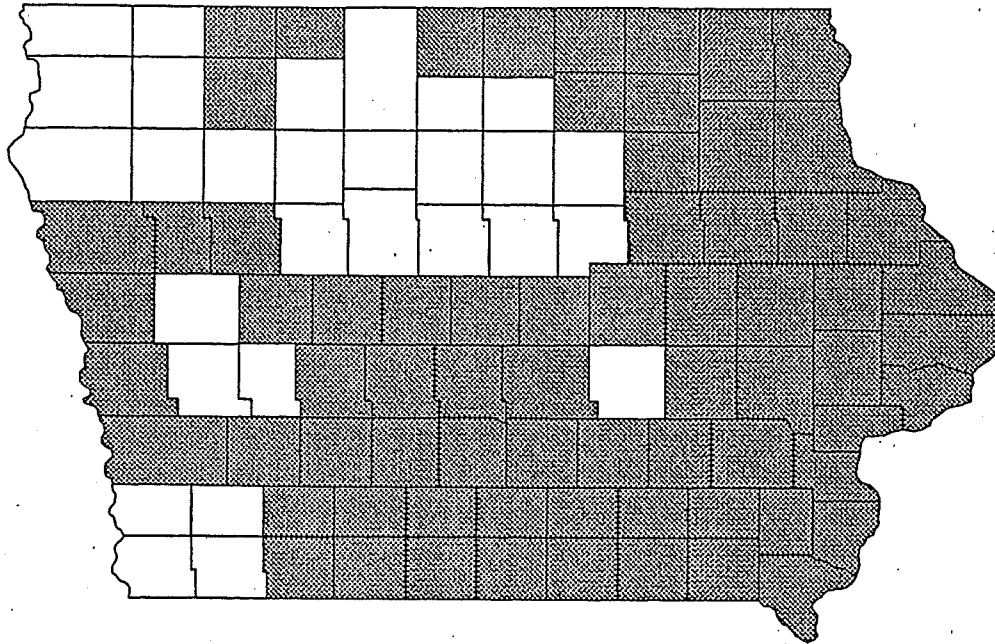
Forest Insects & Diseases

Oak wilt caused by the fungus *Ceratocystis fagacearum* invades the water conducting tissues (xylem) of oak trees and causes the foliage to wilt and die. During 2000, using a more accurate tree count rather than area count, DNR foresters reported 388 new acres of oak wilt infections. Although all species of oaks are susceptible, the red oak group especially black oak *Quercus velutina*, northern red oak *Quercus rubra* and pin oak *Quercus ellipsoidalis* often die within weeks of infection. Bur oak *Quercus macrocarpa* was also observed with oak wilt symptoms. Oak wilt is spread via root grafts and sap-feeding nitidulid beetles. Although there is no cure for oak wilt, control strategies such as preventing tree wounds during high infection periods (March 1 to June 1), disease containment by cutting or killing roots of infected trees and killing oak trees surrounding the infected trees all appear to have some use in management and prevention. Sanitation of dying and dead oaks before oak wilt fruiting bodies appear in the following spring reduces the risk of overland spread. This year in the Des Moines metro area, oak wilt was confirmed in late August and early September on red and bur oaks. High-valued oaks can be protected through high cost systematic injections of a fungicide, which has become more available through local tree care companies.

Reports of Dutch Elm Disease 2000



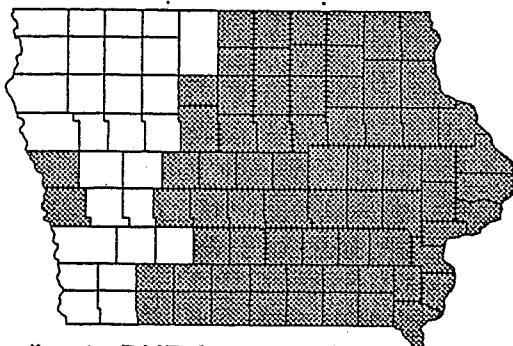
Reports of Oak Wilt/Decline 2000



Dutch elm disease (DED) caused by the fungus *Ophiostoma umli/novo-umli* impacted approximately 78 acres of American elms *Ulmus americana* across the state in small, scattered and isolated spots. Continued lack of sanitation efforts provides breeding sites for DED fungus carrying bark beetles that spread the disease over land.

by field foresters in central and eastern Iowa. Although the exact cause of this dieback/decline of native trees is still under investigation at Iowa State University, DNR field foresters are recommending early removal of white ash during commercial and pre-commercial thinnings of forests.

Reports of Deer Browse Damage 2000

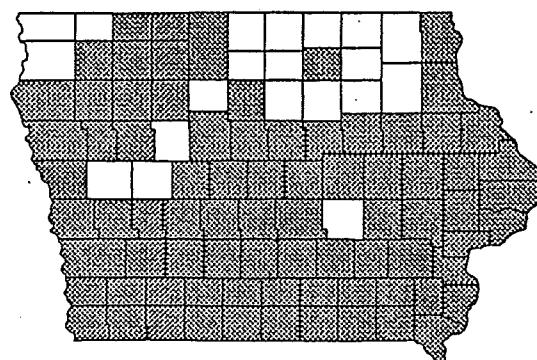


According to DNR foresters, browse damage by white-tailed deer *Odocoileus virginianus* impacted over 600 acres of recently established forest and Christmas tree plantations in 72 out of 99 Iowa counties. Expanded deer hunting seasons, combined with fencing and repellent efforts by private landowners have been encouraged in hopes of reducing future impacts of deer browse on tree seedlings.

Non-native Scotch pine *Pinus sylvestris* is one of the most commonly planted conifers or evergreens for wildlife habitat, windbreaks and ornamental trees in Iowa. Over the past 3 years increased reports of sudden browning and mortality of Scotch pine has occurred. Both the DNR and Iowa State University believe that, Scotch pine decline is due to bark beetle (*Ips grandicollis*) attack and pine wood nematode *Bursaphelenchus xylophilus* action. Another factor, the Iowa environment and its limitations on moisture also figure into the whole scheme of Scotch pine decline, but there is still

Reports of scattered ash dieback/decline of native white and green ash *Fraxinus americana* and *pennsylvanica* was reported in 44 Iowa counties

Reports of Significant Scotch Pine Mortality 2000



not enough information to give a definitive cause and effect. The particular loss of Scotch pine occurs most often in stagnate and dense plantings on heavy clay soils, when the trees are 20-30+ years of age. But reports of Scotch pine declining from Christmas tree-size to larger trees have also been reported. DNR foresters documented that 270+ acres of Scotch pine were lost over the year 2000 in 73 out of Iowa's 99 counties. Further survey and cause determination is being jointly pursued by the DNR and Iowa State University Departments of Entomology and Plant Pathology.

Christmas tree plantations from northwestern to southeastern Iowa reported scattered outbreaks worm-like European sawflies that eat the pine needles of Scotch and white pines. Although not significant on a statewide basis, approximately 100 acres were impacted. Damage to Christmas and ornamental trees can be significant to local growers. Northern portions of Iowa, where abundant moisture existed through out the year, reported scattered tree mortality and impact on Austrian *Pinus nigra* and Ponderosa pines *Pinus ponderosa* from Diploda tip blight *Sphaeropsis sapinea*. North Central Iowa reported significant observations of spider mite damage on spruce (*Picea* spp.) windbreak and ornamental plantings. The southern 1/2 of Iowa where droughty conditions were the norm reported significant numbers of Aphids on broadleaf species of oak, maple, locust and ash.

Gypsy Moth in Iowa

The gypsy moth *Lymantria dispar* is a potentially serious exotic defoliator of Iowa's native deciduous trees and shrubs. Originally brought to the US in the 1860's from Europe to help develop the silk worm industry, it escaped and has severely impacted the the forests of the northeastern states, and is now becoming a greater presence in the lake states of Michigan and Wisconsin.

The gypsy moth program in Iowa is coordinated by the State Entomologist with the Iowa Department of Agriculture and Land Stewardship, along with the Iowa DNR and ISU Extension. Gypsy moth survey trapping results in Iowa from 1999, identified 4 nursery dealers for eradication treatment with *Bacillus thuringiensis*. Two sites

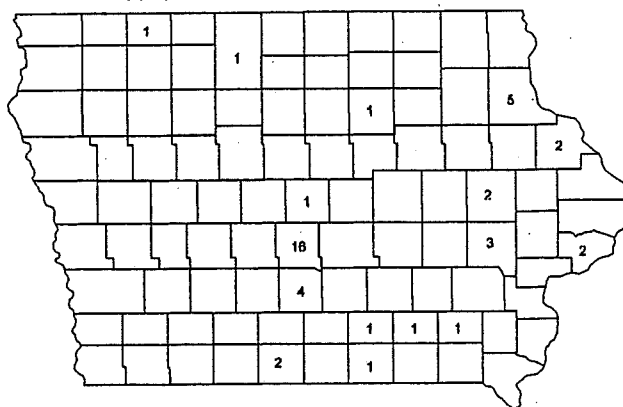
were treated by IDALS and USDA personnel involving 22.5 acres, another site of approximately 10 acres was treated by the nursery operator with *Sevin*. The other site was monitored for evidence of other life stages of the gypsy moth during 2000.

During the 2000 gypsy moth trapping season (May 1st to September 1st) a total of 46 male moths were caught in 16 Iowa counties. This is a significant drop from the 135 male moths caught in 1999 and the 371 moths caught in 1998. No male moths were caught in the areas treated based upon the 1999 survey. The greatest number were caught in Polk county, associated with imported and infested nursery stock from Michigan. Significant survey work will be conducted again in 2001.

A New Forest Health Concern

Exotic pests in the form of insect and diseases of our trees and forests have been monitored for over 20 years. But perhaps the greatest forest and tree health issue in Iowa is just being realized, exotic and invasive plants. Work is now in progress to better identify the invasive plants and their impacts across the state in a partnership effort with public and private organizations.

Gypsy Moth Catches 2000



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Wyoming



Program Fact Sheet

FOREST HEALTH

2000

Introduction

Forest health has gained tremendous public attention due to environmental concerns about air pollution, acid rain, global climate change, introduction of exotic insects and diseases, and population growth. Wyoming State Forestry Division (WSFD) plays an active role in addressing forest health concerns on State, private, and municipal properties in Wyoming. WSFD participates in the National Forest Health Monitoring (FHM) Program. This is a partnership with the USDA Forest Service, particularly the Intermountain Research Station (Region 4) in Ogden, Utah, and the Lakewood Service Center (Region 2) in Lakewood, Colorado. FHM was developed by federal and state agencies to monitor and report the status and trends of forest ecosystem health. Wyoming's forest health specialist is the State contact for the FHM program and is responsible for administering insect and disease and other forest health programs on all non-federal forested lands in Wyoming. Wyoming has 2.16 million acres of nonfederal-forested land with approximately 277,000 acres under State ownership. Wyoming also has an estimated 155,000 acres of community forests and 600,000 acres of riparian forests. Insects and diseases are the largest factors contributing to tree mortality and decreased growth across all land ownerships. The following section outlines the major duties and responsibilities of Wyoming's forest health program.

- ▶ Prescribe forest management plans to reduce susceptibility to destructive insects and diseases on all land ownerships
- ▶ Provide technical assistance to private landowners in the identification, evaluation, and control of insect and disease infestations
- ▶ Coordinate with private landowners and public agencies in the distribution of biological control agents for noxious weeds
- ▶ Identify pest specimens submitted by public citizens and State foresters
- ▶ Monitor and assess resource losses from insects and diseases on State, federal, and private lands through aerial and ground detection surveys and evaluations
- ▶ Provide professional training and forest health information to private landowners, State land managers, industry foresters, municipalities, and University of Wyoming programs through organized training sessions, literature, and newsletters
- ▶ Evaluate impacts of new or exotic forest health problems
- ▶ Participate in FHM conference calls, workshops and training, and assist with preparation of required reports
- ▶ Cooperate with APHIS on continuing gypsy moth surveys
- ▶ Provide forest health information to media, public officials, and Wyoming's citizens through written and verbal correspondence
- ▶ Transfer new pest management technology to all interested parties

Funding

Wyoming has been a cooperator with the USDA Forest Service's Forest Health Monitoring Program since 1995. Five-year funding from Forest Health Monitoring is as follows:

FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
\$22,880	\$23,520	\$20,000	\$27,000	\$27,000

Issues/

Accomplishments

- Noxious weed invasion on forested lands is a problem on all ownerships.
- Exotic insects such as European and Asian gypsy moths and the Asian longhorned beetle pose a threat to Wyoming's forests.
- Subalpine fir decline causes widespread mortality of subalpine fir in high-elevation spruce/fir forests in Wyoming. This complex is poorly understood but is thought to be caused by a combination of factors such as western balsam bark beetle, fir engraver beetle, and Armillaria root rot.
- Multiple catches of European gypsy moth occurred at F.E. Warren Air Force Base in 1996, 1997, and 1998. Delimiting trapping in 1999 and 2000 revealed no positive catches at F. E. Warren Air Force Base. Four gypsy moths were captured in Washakie County in 1999. Delimiting trapping in Washakie County during 2000 yielded no positive catches. There were no gypsy moths captured in 2000 statewide.
- Approximately 6,000 acres of State-trust and private lands in southern Carbon County were surveyed for risk of spruce beetle infestation during 2000. Survey results will be used to design forest management plans to mitigate spruce beetle impact in 2001.
- Aerial sketchmapping was conducted on 53,000 acres of Casper Mountain. Private landowners and Natrona County officials are using this information to mitigate current insect and disease activities.
- White pine blister rust occurs in several stands of limber pine in the Pole Mountain area of the Medicine Bow National Forest and Ten Sleep Canyon of the Bighorn National Forest.
- Lilac/ash borer continues to attack Wyoming's native green ash trees. This insect is causing considerable mortality of new plantings of cultivars of green and white ash.
- Forest insects and diseases play critical roles in forest health, ultimately influencing wildfire frequency and intensity. This is evident in native forests as well as the expanding urban-wildland interface.
- Mountain pine beetle populations are apparently increasing across the eastern foothills of the Bighorn Mountains.
- Bronze birch borer is causing considerable mortality of native and introduced birch trees in Wyoming's urban forests.
- Russian olive and saltcedar are exotic species that are replacing many native cottonwoods in Wyoming's riparian areas.



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2000 Insect and Disease Conditions Report - Wyoming

Insects: Native

Douglas-fir beetle

Scientific Name - *Dendroctonus pseudotsugae*

Wyoming

Hosts: Douglas-fir

Narrative: Douglas-fir beetle is still making an appreciable impact on state-trust lands in Fremont County. State-trust and private lands near Enos Creek and South Pass lost approximately 60 Douglas-fir in 2000 to Douglas-fir beetle. There are endemic levels of Douglas-fir beetle on state-trust lands in the southern Bighorn Mountains and in southwest Wyoming. Forest Service aerial surveys show increases in activity on the Clarks Fork and Wapiti Ranger Districts of the Shoshone National Forest. In 1999, approximately 14,449 trees were killed on 5,791 acres and this increased to 25,971 trees on 7,636 acres in 2000. The North Fork of the Shoshone River showed several large pockets of mortality (50 trees or more were killed).

Mountain pine beetle

Scientific Name - *Dendroctonus ponderosae*

Wyoming

Hosts: limber pine, lodgepole pine, ponderosa pine

Narrative: Wyoming State Forestry conducted a 53,000 acre aerial survey of Casper Mountain (Natrona County) in October and recorded approximately 147 ponderosa pines killed by mountain pine beetle on private and county property. Teton County, particularly the Jackson area, currently has endemic levels of mountain pine beetle. Mountain pine beetle is causing considerable damage in ponderosa pine in the lower foothills starting from Kaycee in Johnson County and proceeding north to Dayton/Ranchester areas in Sheridan County. This comprises State, private, and federal land ownerships. Mountain pine beetle in association with white pine blister rust impacted 3,617 trees in a 2,000 acre area in the Shoshone National Forest. Ponderosa pine mortality across all land ownerships caused by mountain pine beetle increased from 25,562 trees killed in 1999 to 38,262 trees killed in 2000 in the Black Hills National Forest. Most of this mortality (36,737 trees) occurred on national forest lands in South Dakota and Wyoming. Wyoming totals on federal property in the Black Hills National Forest showed 1,647 trees killed on 1,567 acres. State and private property totals in the Black Hills in Wyoming included 1,286 ponderosa pines killed on 1,298 acres.

Spruce beetle

Scientific Name - Dendroctonus rufipennis

Wyoming

Hosts: Engelmann spruce

Narrative: Approximately 6000 acres of state-trust and private lands in southern Carbon and Albany Counties were surveyed for the risk of spruce beetle infestation. This survey is in response to the anticipated spruce beetle buildup in northern Colorado due to the Routt Divide Blowdown in October 1997. Forest management plans are being considered to mitigate spruce beetle in 2001. Forest Service aerial surveys showed severe spruce beetle damage in the backs of many side drainages of the North Fork and South Fork of the Shoshone River. During 1999, spruce beetle killed approximately 15,011 trees on 5,523 acres. This increased to 138,745 trees on 17,874 acres in 2000. Most of this activity is occurring in the Washakie Wilderness of the Shoshone National Forest. There are considerable acreages of Engelmann spruce blowdown in the Snowy Range area in Albany and Carbon Counties and the North and South Forks of the Shoshone River.

Pine engraver beetle

Scientific Name – Ips pini

Wyoming

Hosts: Ponderosa pine

Narrative: Ips bark beetle is severely impacting smaller-sized ponderosa pines on state-trust sections in northeast Wyoming. Large patches are also being observed on private property in this area.

Insects: Nonnative

European gypsy moth

Scientific Name - Lymantria dispar

Wyoming

Hosts: hardwood species

Narrative: No adult gypsy moths were captured in Wyoming during 2000. Delimiting trapping in Ten Sleep and Worland due to multiple catches in 1999 yielded no catches in 2000. There have been no catches in 1999 and 2000 at the F.E. Warren Air Force Base in Cheyenne after multiple catches occurred in 1996, 1997, and 1998.

Diseases: Native

Armillaria root disease

Scientific Name - Armillaria mellea

Wyoming

Hosts: ponderosa pine, lodgepole pine


Narrative: As in 1999, Armillaria is affecting ponderosa pine in state-trust sections in northeast Wyoming (Crook and Weston counties).

Dwarf mistletoes

Scientific Name - Arceuthobium spp.

Wyoming

Hosts: Douglas-fir, lodgepole pine, ponderosa pine

Narrative: There was ^{NO} observable dwarf mistletoe in ponderosa pine in 2000 in northeast Wyoming (Crook and Weston Counties). Lodgepole pine dwarf mistletoe is common in the Green Mountain area in Fremont County where 5,000 acres (state, federal, and private properties) are adversely affected. Douglas-fir and lodgepole pine dwarf mistletoes have increased in the Salt Creek Pass area in Lincoln County in western Wyoming. Shoshone National Forest with the majority located at the southern end of the Wind River and Washakie Ranger Districts. This continues to be a problem on State lands in the Green Mountains of Fremont County. There are roughly 5000 acres of lodgepole pine infested with dwarf mistletoe in the Green Mountains. 

Diseases - Nonnative

White pine blister rust

Scientific Name - Cronartium ribicola

Wyoming

Hosts: limber pine, whitebark pine

Narrative: Although not confirmed, several limber pine stands on Casper Mountain are suspected of being infected by white pine blister rust. White pine blister rust is severely impacting limber and whitebark pines in Fremont and Park Counties. Forest Service aerial surveys show white pine blister rust and a host of other agents (mountain pine beetle, needlecasts, etc.) damaged more than 7,500 acres of white pine in the Shoshone National Forest.

Declines and Complexes

Subalpine fir decline

Wyoming

Hosts: Subalpine fir

Narrative: Many stands of subalpine fir are declining on private and state properties in central Wyoming. Large pockets of subalpine fir are declining on Little and Pine Mountains south of Rock Springs. Armillaria root disease and western balsam bark beetle are thought to be the primary contributors to this decline. A total of 8,630 trees on 4,566 acres in the Shoshone National Forest were affected by this decline in 2000.

Abiotic Damage

Wind (blowdown)

Wyoming

Hosts: Engelmann spruce

Narrative: As in 1999, there are reportedly isolated patches of downed Engelmann spruce in the Snowy Range of the Medicine Bow National Forest. These areas are suspected to be the result of severe winds and will undoubtedly be rated for spruce beetle potential. Approximately 1000 ponderosa pine on state-trust lands were blown over in northeast Wyoming.

02/20/2001

USDA INVESTIGATES POSSIBLE VIOLATIONS OF GYPSY MOTH QUARANTINE

CHEYENNE, WYO., Jan. 16, 2001--The U.S. Department of Agriculture is looking into possible violations of federal gypsy moth quarantine regulations after several shipments of spruce trees from an area regulated for gypsy moth were detected by Wyoming agricultural officials.

In October, several truckloads of trees reached Wyoming from a nursery in Michigan and were stopped at the Wyoming border. The trees were sent back to Michigan after inspectors determined they were from an area regulated for gypsy moth and had not been properly certified as gypsy moth free. A number of unplanted trees, which had made it to Jackson Hole, were also destroyed. Since then, USDA's Animal and Plant Health Inspection Service, working in cooperation with the Wyoming Department of Agriculture, has identified a small number of trees from the same regulated area that were already planted in Jackson Hole.

"The discovery of these trees does not mean that we have an infestation of gypsy moth in the Jackson Hole area," said Richard L. Dunkle, deputy administrator for APHIS' plant protection and quarantine program. "But it is possible some gypsy moth egg masses could have traveled to Wyoming on the trees. When the snow melts in the spring, APHIS will be extra vigilant in its efforts to ensure that Wyoming remains gypsy moth free."

Although the location of the spruce trees in question is known and property owners have been notified, the exact trees are difficult to identify because they have been planted next to other spruces. Local landscapers were not involved in the possible violation and have been working with USDA and the state officials to identify the trees in question.

To ensure that the Jackson Hole area is protected against a gypsy moth infestation, APHIS, in cooperation with the Wyoming Department of Agriculture and USDA's Forest Service, will be conducting a stepped-up survey effort in late spring and summer to detect any presence of the gypsy moth in the Jackson Hole area. Gypsy moth surveys use small nontoxic cardboard collection traps. While the gypsy moth is already established in the northeast and northern central United States, routine annual surveys are carried out in western states, including Wyoming, to make sure the gypsy moth is not moving westward. The Jackson Hole area has been surveyed annually since the mid-1980s. Although occasional single moth finds have occurred around Jackson Hole, the gypsy moth has never been found to be established.

The gypsy moth is a serious pest of deciduous trees and certain evergreen trees. Over a period of years, gypsy moth outbreaks can cause serious tree damage due to repeated defoliation.

Note to Editor: For further information, contact John C. Larsen, APHIS (307) 772-2323 or Jim Bigelow, WDA (307) 777-7324

