Great Plains Tree Pest Workshop

University of Nebraska
West Central Research and Extension Center
North Platte, NE

April 30 and May 1, 1996

Tuesday, April 30, 1996

Meeting called to order by Chairperson Mark Harrell at 8:45 am.

Attendees: Mark Harrell, Mike Schomaker, Erik Johnson, Dave Johnson, Bill Schaupp, Judy Pasek, Kurt Allen, Jim Walla, Laurie Stepanek, John Ball, Jeri Lyn Harris, Bill Jacobi, Dave Wysong, and Ned Tisserat.

Announcements -

Les Pinkerton will retire in December and it does not appear that he will be replaced. Mailing list was distributed for corrections and updates.

Additional Agenda items suggested -

Verticillium wilt survey.
Pine planting species recommendation list.

1995 minutes were approved as distributed by Dave Johnson.

State and Organizational reports (20-30 minutes each):

Copies of printed reports were distributed and are attached for those not attending this meeting. Additional discussion of note is reported below. A common thread in all these reports was the 1995 increase in diseases from the excessively moist spring months of May and June.

Kansas (Ned Tisserat) -

No established populations of Gypsy moth have been discovered in Kansas. Pine wilt in SE Kansas is so bad that Scotch pine is not recommended for planting. Ned suggested we should work with state conservation districts (NRCS) to change spacing recommendations for plantings in windbreaks to avoid problems with diseases. Ned is experimenting with biological control of Persimmon with the fungus Acremonium (looks promising). Ash project looking at Verticillium that may come from latent infections from nurseries. Working with techniques to

detect these infections.

Colorado State University (Bill Jacobi) -

Expecting to see root damage on honeylocusts over the next 12 months from the extremely moist spring of 1995. Pseudomonas blight was very bad in nurseries last year but Bill does not expect to see much Pseudomonas blight this year due to lack of moisture in spring of 1996. No other states reported seeing Pseudomonas blight as a significant problem. IPM project is also looking at cankers on various hosts. Hybrid elms from Smalley are being checked for adaptability to Colorado's extreme environmental conditions. Turf and tree research will not be using fertilizers and herbicides. Trees will be mulched. If you send Cytospora specimens to Bill, three branches per host would be the ideal sample size.

Region-2 USFS (Rapid City Service Center) -

Jeri Lyn will be continuing the Armillaria root disease survey this year. Regeneration of Jack pine in the Halsey National Forest is very difficult to impossible. The initial planting of these sand dunes was with seedling trees while current regeneration efforts are from seed. Bill Schaupp offered to provide copies of the Riparian Zone Ecology white paper Literature review to anyone desiring a copy. South Dakota, like other states, got Gypsy Moth infested stock from Michigan distributed through SHOPKO and WALMART stores. Judy has not been able to test MPB risk rating projections to determine which model is more correct. Most of their calls for assistance come from the woods, they get very few requests from the plains.

South Dakota (John Ball) -

John asked that we strike this sentence.

John didn't get any information for this report from Rich Dorset before he left his position. ~~John is hoping that the state will fund a replacement for Rich.~~ Planting too deep is a problem in South Dakota because landowners are concerned that trees will snap off when you leave the graft union above the ground. These are typically planted a foot too deep. Lawn and garden shops are even recommending planting trees at least six inches deeper than they should. Flooding has benefitted some riparian areas by eliminating Russian-olive and cedars (roots covered for 30-60 days) from the river bottoms. Other areas have lost some desired species such as hackberry and willows. Essentially flooding is good!! John wanted to know if other states were having problems with Hackberry or had ideas concerning the cause of Hackberry decline. The problem does not appear to be infectious - it doesn't spread like a disease. Herbicides may be a factor in Kansas. Symptoms don't tend to be similar in Kansas like they are in South Dakota. Root problems fit these symptoms but how do we check this!?

North Dakota (Jim Walla) -

Western gall rust project will end shortly as no researcher will be funded to continue the project. Most branch galls are thought to be a single genotype but multiple infections can form galls that are split down the middle or divided into multiple sectors. Pycnia have no function in gall formation. Presented slides on Aspen stunt and unknown juniper diseases. Aspen stunt doesn't fit the descriptions of any viral diseases reported or associated with aspen. If this is a phytoplasm disease, it's one we don't know as Jim used all the universal primers in his analysis. Juniper problems appear to work primarily in the lower crown from outside in not inside out. Symptoms progress upward through the crown. When Jim started marking trees he found that symptoms don't spread very rapidly. Salt may be a suspect but Jim has no idea as to the causal agent. No soil analysis has been done but root samples don't indicate root mortality. This problem seems to have developed recently - nobody recalls these type of symptoms previously. Nursery trees showing these symptoms had not gone through a winter in North Dakota but they were exposed to a frost. General feeling of the audience is that rapid onset of these symptoms indicates an environmental problem but Jim has a hard time explaining this wide range of symptoms as environmental.

Colorado (Mike Schomaker) -

Wet spring weather led to an increase in bacterial and fungal diseases while an early September snow contributed to the already high populations of smaller European elm bark beetle (from the Halloween freeze of 1991). Dutch elm disease increased in the metropolitan Denver area. This increase is did not occur in other cities throughout Colorado even though bark beetle populations increased state wide. A possible explanation for the Denver metro increase is related to the number of DID therapeutic injections that occur in the metropolitan Denver area as compared to other cities. Although lab services are now handled by the CSU Plant Diagnostic Clinic, CSFS continues to receive samples from trees with environmental or difficult to diagnose problems. Mike also gave an update of Forest Health Monitoring in Colorado.

Region-2 USFS (Lakewood Service Center) -

Offered Erik Johnson's assistance with aerial surveys to other states in the Rocky Mountain Region. They will add Fort Carson as a Gypsy moth trapping site in 1996. Shelterbelts at Bessey Nursery were surveyed for Sphaeropsis blight and one infected tree upwind from the nursery was detected. It has been removed. The Douglas-fir tussock moth problem in Colorado may be soil related and isolated in the recently defoliated area of the South Platte Ranger District. Bill Schaupp offered to provide copies of a slide set covering the biology and symptoms of a pine tussock moth (*Dasyshira grisefacta*) to any interested individual. Requests should be directed to Bill. Aerial detection will be directed

primarily at MPB.

Nebraska (Mark Harrell and Dave Wysong) -

Hail damage appears to be responsible for increases in Sphaeropsis blight in forested areas. These hail storms appear to lead to "explosive" increases of the disease. Prior to the storms Sphaeropsis was hardly detectable in these stands. Contrary to the insect findings with windbreak sheltered areas, many field crop diseases increase in sheltered areas. Shelterbelts increase crop yields too. However, farmers continue to rip out windbreaks for tax reasons, irrigation or the misconception that more land planted to crops equals more productivity. The mulch study will help determine the cost effectiveness of various mulches. Injections are the only current treatments that work for chlorosis in Nebraska. Soil treatments would be a nice alternative, if it works. Trunk injections using the Wedgle injector appear to be extremely safe for use in trees. Physical damage to trees is very minimal and appears to be limited to the point where the needle contacts the xylem not from lifting the bark. The major drawback to this system is that some trees do not allow uptake or lifting of the bark and the concentrated chemicals are propelled back towards the applicator.

Ash Yellows Survey Presentation - Jim Walla

Bob Averill procured funding for a Great Plains Ash yellows survey in 1996. Five states (Colorado, Kansas, Nebraska, North Dakota and South Dakota) will be involved in this survey. This is going to have to be an indicative survey due to the number of samples requiring assay (over 1100 samples). Jim presented a history of Ash Yellows on Green ash in the U.S. It exists throughout the range of Green ash from east to west. It appears to have exploded over a two year period of time when you look at when witches brooms formed on green ash in western states (Montana, Nebraska, North Dakota and South Dakota). Witches brooms are the only visual means of detection. Dieback, brooms, basal shoots and gradual loss of apical dominance are early indicators of possible diseased trees. Suckers are not brooms! Broom shoots do not typically elongate like suckers. Shoots in brooms don't live very long - there are many dead shoots in ash yellows brooms.. There is no terminal dominance in broom shoots. Brooms typically have some single leaflet leaves. Monoclonal antibodies can be used to detect ash yellows with fluorescence microscopy (looking for immuno-fluorescence as opposed to background auto-fluorescence). DAPI is a technique that can also be used for phytoplasma detection, but picks up anything whereas the monoclonal antibody detects only ash yellows. Vectors for ash yellows have not been deteremined. Described symptoms of ash yellows include slow/diminished apical and radial growth, deliquescent branching, suppressed root development and witches brooms. If you find a lilac with witches brooms, get a sample - it could be ash yellows!

Kansas pine species planting list -

Ned feels there are no pines he can recommend for planting in Kansas due to disease

problems. Are there any other states having this problem? Any suggestions? Other states don't appear to have this problem.

Tree and woody shrub insect and disease extension outreach publications survey and compilation-

Bill Jacobi and Mike Schomaker will act as a clearing house and distribution point for a list from the Great Plains. Bill will be the compiler of the list. Get your publication lists to Bill as soon as possible!

Old Business - None

New Business -

Plains and Prairie Forestry Association membership as a committee:

Moved and seconded to join this group. Positives: advantagous to both groups; pest specialists get input from managers; . Negatives: may be difficult getting on the agenda; fragmentation may occur; attendance may increase or decrease; dues and registration fees. Moved and seconded to table the vote on the motion. Voted to table the motion until tomorrow.

Election of new officers -

Bill Jacobi was elected as Chairperson by a close vote
Lia Spiegel was unanimously elected as secretary.

Next meeting location -

A motion passed to designate Cheyenne, WY as the site of the next meeting or at a location in Wyoming to be determined by the newly elected officers.

Wednesday, May 1, 1996

Continued discussion on Tuesdays tabled motion -

More pros and cons discussed. Motion to join Plains and Prairie Forestry Association was defeated by unanimous vote.

Bill Jacobi, as next Chairperson, will send the Association a letter informing them of our existence and expressing our interest in working with their group.

Meeting was formally adjourned at 8:40 am to allow people not involved in the Ash yellows project to depart.

Submitted by Mike Schomaker, Secretary

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KANSAS

FOREST AND WINDBREAK PEST REPORT

1996

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FOREST AND WINDBREAK PEST REPORT

1996

GENERAL

Weather - The 1996 weather was very unusual and the extremes affected the insect and disease problems on trees and shrubs. The year started out with a very dry winter and spring that reduced some of the disease problems like anthracnose. However, some of the insect problems may have been increased by the very mild winter. Cold temperatures in the spring also helped reduce the disease problems. After spring rains started the year was very wet with no long dry periods which is very unusual. The fall of 96 was also very wet so most species should go into the winter in good condition.

Highlights - Fall webworm damage was probably as severe as it has been in the last 30 years. Reports of webs on species not normally affected was quite common.

Kansas participated in the ash yellows research funded by U.S. Forest Service. A total of 150 trees at 15 locations were tested for ash yellows. The locations included urban, native and windbreak ash trees. Sixty seven percent of the trees tested positive for the ash yellows organism. However, there appeared to be no correlation between the presence of ash yellows and the vigor of the ash trees. The Kansas research was conducted by Ned Tisserat, in the Plant Pathology Department. Kansas State and Extension Forestry assisted in the location of trees to include in the research.

INSECTS

1. Walnut Caterpillar (Datana inteferrima)

   Hosts: Black Walnut
   Hickory
   Pecan
   Bur Oak

Damage: Damage reports were much greater in number than normal. Even second generation damage was reported. Major defoliation was reported in some areas, but control measures were mostly applied to individual trees.

Acres: 150

Problem: Damage usually limited to individual trees in a stand.

Future: Populations will vary each year.

2. Yellow-necked Caterpillar (Datana ministra)

Host: Oaks
Basswood
Fragrant Sumac
Maple
Elm

Damage: Damage was about normal, but populations were not large enough to cause complete defoliation of the tree.

Acres: 75

Problem: A recurring problem usually limited to isolated trees or shrubs.

Future: Extensive damage will probably be limited to individual trees or shrubs rather than being a major forest or shelterbelt problem.

3. Walnut Trunk Webbing Insect (Gretchena concitatricana)

Host: Walnut

Damage: Insect population was very low again and no reports of major damage were reported. Although some leaf damage and larvae were observed, the population was not high enough to cause any webbing on the trunk.

Acres: 10

Problem: Since this is a new insect the extent of damage is not known. However, the defoliation seems to be in groups of trees rather than individual trees as observed with the walnut caterpillar.

Future: Need to determine the purpose of the webbing and identify any natural predators.

4. Zimmerman Pine Moth (Dioryctria ponderosae)
Pine Pitch Moth (Synanthedon pini)

Host: Ponderosa Pine
Austrian Pine

Damage: Damage to a few windbreaks in northwest Kansas continues to be reported by the Kansas Department of Agriculture.

Acres: 6

Problem: The insect was found for the first time in Kansas in 1990. Damage has been restricted to the northwest part of the state.

Future: Windbreaks will be closely observed to determine if the insect is attacking new windbreaks.

5. Cankerworms (Alsophila pometaria and Paleacrita vernata)

Hosts: Green Ash
Elm
Hackberry
Honeylocust

Damage: Damage was quite low again this year. No reports of major defoliation were received. The cold, dry spring reduced the number of cankerworms.

Acres: 75

Problem: Some cankerworm damage can be expected each year.

Future: Populations are quite cyclic and difficult to predict.

6. Nantucket Pine Tip Moth (Rhyacionia frustrana)

Host: Scotch Pine
Ponderosa Pine
Virginia Pine
Austrian Pine

Damage: Damage reports were quite varied across the state again this year. Some Christmas tree growers reported 3 generations of tip moth again this year.

Acres: 200

Problem: A recurring problem that can be expected each year. There is a possibility that three species of tip moth may occur in the state. This would explain the overlap of generations that has been observed.

Future: Populations are cyclic and are monitored closely by the growers.

7. Gypsy Moth (Porthetria dispar)

Damage: No gypsy moths were caught in Kansas this year. Increased trapping at Fort Leavenworth, where a moth was caught last year, resulted in no new moths being caught. .

Acres: None

Problem: The gypsy moth has not become established in Kansas. Many agencies are cooperating to locate pheromone traps in all counties so control measures can be implemented when necessary.

Future: Trapping will be continued in 1997.

8. European Pine Sawfly (Neodiprion sertifer)

Host: Scotch Pine

Damage: Damage reports were lower than normal. Some growers reported not having to implement control measures at all.

Problem: Pine sawfly is a recurring problem that is increasing each year.

Future: Damage is expected to increase in Christmas tree plantations and will become more of a problem in windbreaks.

9. Loblolly Pine Sawfly (Neodiprion taedae taedae)

Host: Austrian and ponderosa pine

Damage: Positive identification still has not been confirmed. Larvae were collected by the Department of Agriculture with hopes of getting some adults for positive identification. Aerial application of insecticides was applied to approximately 20 windbreaks in northwest Kansas.

Problem: The loblolly pine sawfly could become a serious problem in windbreaks in Northwest Kansas. The spread of the insect will be monitored the next several years.

Future: Damage is expected to increase and will probably be reported in additional counties the next several years.

10. Juniper Sawfly (Monoctenus fulvus)

Host: Rocky Mountain Juniper
Eastern Redcedar

Damage: After several years of almost no damage being reported, heavy infestations were reported in northwest and northeast Kansas. Some aerial application of insecticide was applied to windbreaks in northwest area of state.

Acres: 60

Problem: A very cyclic insect that is a recurring problem.

Future: Damage can be expected in the future.

11. Elm leaf beetle (Pyrrhalta luteola)

Host: Siberian Elm
American Elm

Damage: Damage was light in most of the state.

Acres: 70

Problem: This is a recurring problem that usually requires control of at least one generation.

Future: Increased use of systemic insecticides will be needed for good control.

12. Imported Honeysuckle Aphid (Hyadaphis tataricae)

Host: Tartarian Honeysuckle

Damage: Other shrubs are being recommended for windbreaks because the aphid is difficult to control.

Acres: Not available

Problem: A recurring problem that continues to increase each year.

Future: Will probably be replaced by other shrubs in windbreaks.

13. Bagworms (Thyridopteryx ephemeraeformis)

Host: Junipers

Damage: Bagworm populations were reported as very high in eastern and central Kansas. Some landowners reported poor control of bagworms.

Acres: 90

Problems: Bagworms are a recurring insect that are very cyclic but when detected

control measures are very important.

Future: Emphasis will be placed on early application of insecticides to assure good control.

14. Lilac Borer (Podosesia syringae)

Host: Green Ash

Damage: Damage reports were normal.

Acres: 40

Problem: Site and weather related insect that usually is limited to recently transplanted trees or those under stress.

Future: Proper site selection is very important to reduce damage to plantations.

15. Fall Webworm (Hyphantria cunea)

Host: Walnut
Hickory
Mulberry

Damage: Very heavy damage reported in eastern part of the state. Many species of trees that usually don't have a problem with fall webworm were affected.

Acres: 300

Problem: A recurring problem every year.

Future: Some damage expected every year but usually not severe enough to require control measures.

16. Hackberry Caterpillar (Asterocampa celtis)

Host: Hackberry

Damage: Population was normal, although reports were mostly from the northern half of the state.

Acres: 50

Problem: Usually this insect is not a problem in forest and windbreak trees.

Future: Damage will be very minimal in most years, but severe infestations may occur at any time.

17. Greenstriped Mapleworm (Dryocampa rubicunda)

Host: Silver Maple

Damage: Moderate defoliation was reported in eastern part of the state.

Acres: 40

Problem: Silver maple is not a major forest or windbreak species but urban and recreation areas have a high percent of maples and the greenstriped mapleworm can cause severe damage.

Future: Insect is very cyclic and populations will vary each year.

18. Pine Shoot Beetle (Tomicul piniperda)

Host: Scotch Pine (Preferred)
White Pine

Damage: Beetle has not been reported in Kansas. A federal and state quarantine is still in affect to prevent the spread of the insect into Kansas.

Acres: 0

Problem: If the pine shoot beetle becomes established in Kansas, it will drastically and adversely affect the Christmas tree industry.

Future: Continue to check trees and other pine products that may enter the state.

SUMMARY OF INSECT DAMAGE REPORTED IN 1996

Ash Borer (Podosesia syringae)
Ash Sawfly (Tethida cordigera)
Bagworms (Thyridopteryx ephemeraeformis)
Branch Borers (Oberea schaumii)
Cankerworms (Alsophila pometaria) and (Paleacrita vernata)
Carpenterworm (Prionoxystus robiniae)
Catalpa Hornworm (Ceratomia catalpae)
Claycolored Leaf Beetle (Anomoea laticlavia)
Cottonwood Borer (Plectrodera scalator)
Cottonwood Twig Borer (Gypsonoma haimbachiana)
Eastern Juniper Bark Beetle (Pholoeosnius dentatus)
Elm Leaf Beetle (Pyrrhalta luteola)
European Elm Scale (Gossyporia spuria)
European Pine Sawfly (Weodiprion sertifer)
Fall Webworm (Hyphantria cunea)
Flatheaded Apple Tree Borer (Chrysobothris femorata)
Flatheaded Cedar Tree Borer (Chysobothis texana)
Grasshopper (Melanoplus spp.)
Greenstriped Maple Worm (Dryocampa rubicunda)
Hackberry Caterpillar (Asterocampa celtis)
Hackberry Lace Bug (Corythucha celtidis)
Honeylocust Borer (Agrilus difficulis)
Honeylocust Pod Gall (Dasineura gleditschrae)
Imported Honeysuckle Aphid (Hyadaphis tataricae)
Juniper Scale (Carulaspis juniperi)
Juniper Sawfly (Monoctenus fulvus)
Juniper Webworm (Dichomeris marginella)
Kermes Oak Scale (Kermes spp.)
Leafhoppers (Macropsis fumingennis)
Loblolly Pine Sawfly (Neodiprion taedae taedae)
Locust Borer (Megacyllene robiniae)
Maple leafcutter (Paracleminsia acerifoliella)
Mimosa Webworm (Homadaula anisocentra)
Nantucket Pine Tip Moth (Rhyacionia frustrana)
Oak Bullet Gall (Disholcaspis quercusmmama)
Oak Flake Gall (Neuroterus floccosus)
Orange-striped Oakworm (Anisota senatoria)
Pine Needle Scale (Chionaspis pinifoliae)

Pine Tortoise Scale (Toumeyella numismaticum)
Plant Bugs (Diaphnocoris chlorionis)
Pocket Gall (Macrodiplosis erubescens)
Polyphemus Moth (Antheraea ployphemus)
Redbud Leaf Folder (Fascista cercerisella)
Rosette Midge (Rhabdophaga rosacea)
Spider Mites (Oligonychus ununguis)
Tent Caterpillar (Malacosoma americanum)
Pine Tortoise Scale (Toumeyella numismatica)
Pine Pitch Moth (Synanthedon pini)
Tawny Emperor (Asterocampa clyton)
Twig Girdler (Oncideres cingulata cingulata)
Twig Pruner (Elaphidionoides villosus)
Walnut Caterpillar (Datana intergerrima)
Walnut Plant Bug (Piagiognathus punctatipes)
Walnut Trunk Webbing Insect (Gretchena concitatrican)
Yellownecked Caterpillar (Datana minista)
Zimmerman Pine Moth (Dioryctria ponderosae)

DISEASES

1. Pinewood Nematode (Bursaphelenchus xylophilus)

Host: Scotch Pine
Austrian Pine
White Pine

Damage: Pinewood nematode remains a serious problem in the eastern part of the state. The movement to the west has slowed down and no new counties were reported in 1996.

Acres: 70

Problem: Sanitation is still the only recommended control measure.

Future: The pinewood nematode will probably spread to additional counties in

the eastern parts of the state and will probably move further west to at least highway 81. This may become a major disease in Christmas tree plantations and windbreaks that contain Scotch pine.

2. Pine Tip Blight (Sphaeropsis elisii)

Host: Austrian Pine
Ponderosa Pine

Damage: Reports of damage was down because of the dry spring weather. However, the disease will continue to be a serious problem in the eastern part of the state.

Acres: 140

Problem: Late season infections are becoming more common and are very difficult to control.

Future: Research is continuing on the effectiveness of trunk injections.

3. Anthracnose (Gnomonia plantani and Discula sp.)

Host: Sycamore
Ash
Maple

Damage: Anthracnose reports were just the opposite of last year. Last year was one of the most severe on record. In 1996 very little anthracnose was reported.

Acres: 10 Acres

Problem: A recurring problem that can be expected every year to some degree.

Future: European sycamore can be planted in urban and recreation areas to reduce the anthracnose problem.

4. Thyronectria Canker (Thyronectria arstro-americana)

Host: Honeylocust

Damage: Windbreaks in western Kansas continue to be infected.

Acres: 70

Problem: Honeylocust has been eliminated from some of the older windbreaks because of the canker.

Future: Selection of thyronectria resistant honeylocust will be needed if honeylocust is going to continue to be a desirable windbreak species.

5. Juniper Botryodiplodia (Botryodiploda spp.

Host: Junipers

Damage: The canker was again reported on Rocky Mountain Juniper. However, reports of the disease were very few.

Acres: 40

Problem: Rocky Mountain and other blue type junipers should not be planted in the eastern half of Kansas.

Future: Resistant varieties need to be planted.

6. Kabatina Tip Blight (Kabatina juniperi)

Host: Rocky Mountain Juniper
Eastern Redcedar

Damage: Kabatina tip blight was again reported in windbreaks in northwest Kansas, but was not considered a serious problem.

Acres: 20

Problem: Although the disease is not serious enough to warrant control in windbreaks the landowner becomes quite concerned when observing the dieback.

Future: Resistant varieties need to be developed.

7. Cercospora Blight (Cercospora sequoiae)

Host: Rocky Mountain Juniper
Eastern Redcedar

Damage: Cercospora continues to be a problem on Rocky Mountain Juniper in the eastern part of the state.

Acres: 30

Problem: Plantings with poor air circulation are very susceptible to cercospora infection. It is recommended that Rocky Mountain Juniper not be planted in the eastern part of the state.

Future: Resistant varieties need to be developed.

8. Oak wilt (Ceratocystis fagacaerum)

Host: Oaks

Damage: Oak wilt continues to be a problem in isolated areas, but the number of reports of the disease has been much lower than last few years.

Acres: 30

Problem: A recurring disease that is moving slowly but is probably more wide spread than reported.

Future: May become a more serious problem in the future.

9. Brown Spot (Scirrhia ociola)

Host: Scotch Pine

Damage: Reports of brown spot disease were very high again this year. Christmas tree growers again reported removing and destroying many trees because of the severity of the disease.

Acres: 300

Problem: A recurring problem that is closely related to the weather conditions.

Future: More resistant trees need to be selected.

10. Dothistroma needle blight (Dothistroma pini)

Host: Austrian Pine
Ponderosa Pine

Damage: Dothistroma needle blight was very severe again in eastern Kansas.

Acres: 180

Problem: A recurring problem that is closely related to the weather conditions.

Future: More resistant trees need to be selected.

11. Phomopsis Canker of Russian Olive (Phomopsis arnoldiae)

Host: Russian Olive

Damage: Continues to be a problem in eastern half of Kansas, but very few Russian Olive trees are being planted.

Acres: 30

Problem: A recurring problem that increases each year. No effective control measures are recommended.

Future: Other species will be planted in windbreaks and wildlife plantings.

12. Dutch Elm Disease (Ceratocystis ulmi)

Host: American Elm

Damage: Dutch elm disease is still a serious problem in many Kansas urban areas, the reports of the disease were about normal this year.

Acres: Not available

Problem: A recurring problem that is quite cyclic. However, the sanitation program of the city has a great influence on the spread of the disease.

Future: DED will continue to be a problem in the urban areas for a number of years.

13. Cytospora Canker (Cytospora spp)

Host: Cottonwood
Willow
Mulberry

Damage: The cankers continue to be a problem on trees under stress, but reports were very low again this year.

Acres: 20

Future: Cytospora will always be a problem when trees are under stress.

Future: Disease will be monitored.

15. Herbicide Damage

Host: All deciduous trees

Damage: Herbicide damage to windbreaks and other tree plantings continues to be a serious problem, especially in the western part of the state. Poor stands of wheat because of the dry winter and spring resulted in weed problems. Aerial spraying of wheat fields for weed control was quite common and so was damage to trees close to the wheat fields.

Acres: Not available

Problem: A recurring problem that is very unpredictable. Reports are investigated and confirmed as herbicide damage, but it is the landowners responsibility to pursue collection for damages.

Future: Will continue to be a problem.

16. Verticillium Wilt (Verticillium spp.)

Host: Catalpa
Redbud
Maple
Russian Olive

Damage: Reports of Verticillium wilt was above normal this year.

Acres: 90

Problem: Very little can be done once symptoms of Verticillum wilt appear.

Future: Will continue to vary each year.

17. Elm Leaf Scorch (Xylemella fastidiosa)

Host: Elm and Oaks

Damage: This bacterial disease that looks like scorch was reported again.

Acres: Unknown

Problem: Since this is only the third year the disease has been identified in Kansas the extent of the problem is not known.

Future: The disease may have been around for several years, but the extent of the problem is not known at this time.

SUMMARY OF DISEASES IDENTIFIED IN 1996

Ash Rust (Puccinia sparganioides)
Botryodiploda - Juniper (Botryodiplodia spp)
Botryodiploda - Russian olive (Botryodiplodia theobomae)
Brown Spot (Scirrhia ociola)
Cedar Apple Rust (Gymnosporangium juniperi-veginianae)
Cercospora Blight (Cercospora sequoiae)
Cytospora Canker (Cytospora spp>)
Dothistroma Needle Blight (Dothistroma pini)
Dutch Elm Disease (Ceratocystis ulmi)
Elm Leaf Scorch (Xylemella fastidiosa)
Hackberry Decline
Herbicide Damage
Iron Chlorosis
Kabatina blight (Kabatina juniperi)
Maple Anthracnose (Discula sp.)
Melampsora Leaf Rust (Melampsora medusae)
Needle Blight (Dothistroma sp.)
Oak Wilt (Ceratocystis fagacaerum)
Phomopsis Blight (Phomopsis junierovora)
Phomopsis Canker- Russian olive (Phomopsis arnoldiae)
Pine Tip Blight (Sphaeropsis pini)
Pine Wilt (Bursaphelenchus xylophilus)
Powdery Mildew (Podosphaeria leucotricha)
Root Rot (Fusarium spp.)
Scab (Venturia spp.)
Septoria Leaf Spot (Septoria caraganae)
Sycamore Anthracnose (Gnomia platani)
Tar spot - Maple (Rhytisma acerinum)
Thyronectria Canker (Thyronectria austro-americana)
Verticillium Wilt (Verticillium spp.)
Walnut Anthracnose (Gnomonia leptostyla)
Cold Injury

COLORADO STATE FOREST SERVICE
INSECT & DISEASE CONDITIONS REPORT
1996

INSECTS

Defoliators

Douglas-fir Tussock Moth

West Creek/Sprucewood infestation collapsed (see Schaupp).

Very low levels reported in Denver and Colorado Springs metro areas.

One possible report from a golf course in Vail, where populations have occurred in the past. This site was not visited for confirmation.

Western Spruce Budworm

Populations increased in the Salida area, from Poncha Pass north to Trout Creek Pass, from the Collegiate Peaks east to Salida. An estimated 5000 acres of private land are involved. Defolation of newly-infested Douglas-fir in this area was generally in the moderate category. Many dead trees exist from earlier infestations in the late 1980's and early 1990's.

Infestation continues south of SR148 between South Fork and Wagon Wheel Gap on federal land. No inquiries have been received from private land owners along the lower elevation fringe of this population.

A total of 636 acres of Douglas-fir just north of Lake City were treated for budworm in June. This is part of scattered infestations noted in both Hinsdale and Gunnison Counties on private land.

Gypsy Moth

Positive traps with a single male were found at:
Lafayette (Boulder County)
Hotchkiss (Delta County)
Denver (Denver County)
Northglenn (Adams County)

Delimitation trapping of positive catch sites found in 1995 produced no moths in 1996. No established infestations in Colorado are known at this time. All 1996 catch sites will be delimation trapped in 1997.

Pine Sawflies

Scattered infestations on ponderosa pine of this insect (N. autumnalis mostly) found in Black Forest. About 100 acres defoliated on USAFA east of I-25 (see Schaupp). Few trees reported within town of Castle Rock.

Elm Leaf Beetle

In general populations not bad this year. Heavy defoliation of Siberian elm reported in Castle Rock and Colorado Springs.

Grasshopper (species undetermined) defoliation (heavy) of seedling lilac, caragana, green ash and ponderosa pine reported from Arapahoe, Douglas and Elbert Counties and from Huerfano County north and west of Walsenburg.

Flea Beetles (probably genus Altica) defoliated narrowleaf cottonwoods in the western portion of the San Luis Valley, including the town of South Fork. Damage was light to moderate but generated numerous calls from citizens.

Western Tent Caterpillar defoliation of aspen was noted on federal land at Medino Pass.

Bark Beetles

Mountain Pine Beetle

Perhaps the biggest area of infestation was near Buena Vista, where 2440 infested ponderosa (and a few lodgepole) pines were identified on about 3200 acres (area extending from Maysville north to Twin Lakes). An estimated 71% of these trees were treated by various methods. For this area, based on fall 1996 marking efforts, an estimated 3000 trees are expected on 7000-8000 acres in 1997.

In Summit County 458 trees were found (compared to 634 in 1995). These were lodgepole pine and occurred on 46 acres (11 federal). Most of the 1996 faders were treated.

In Grand County 690 infested lodgepole were found (compared to 245 in 1995) on 132 acres (123 federal). Increased treatments are planned for 1997.

In Eagle County 2277 infested lodgepole were detected (compared to 1021 in 1995) on 20 acres (5 federal). Little treatment has occurred or is anticipated because of access problems.

In summary, the Summit-Grand-Eagle County area had 3425 infested trees in 1996, a 180% increase over 1995. The total acreage of 197 was twice that of 1995. Populations definitely appear to be on the increase.

In Douglas and Elbert Counties, numerous small 2-5 tree groups were discovered in the Jarre Canyon, Russellville, Perry Park and the Pinery areas. No big

problems exist at present but conditions appear right for an increase. [This same statement applies to much of the Front Range, from north of Fort Collins to Colorado Springs. Infestations measured (by John Schmid) to be increasing occurred in the Upper Poudre Canyon, particularly north of Rustic (near Manhattan).]

Engraver Beetles (Ips spp.)

Ips bark beetle activity in ponderosa pine is apparently continuing at high levels in portions of the Black Forest. Species involved include I. pini, plastographus, knausi, and calligraphus.

Ips confusus in pinyon pine continues to cause spotty mortality in the western portion of the state, particularly west of Durango and south of Montrose (Ouray County, etc.). It is found in areas of so-called "pinyon decline", but it is not known if this insect is primary or secondary in such cases.

Ips hunteri has been found killing tops and entire mature Colorado blue spruce along the Front Range, particularly in the Denver, Greeley and Colorado Springs areas. This insect was thought to be pilifrons, but recent determinations by Dr. Steve Wood at BYU confirm the species as hunteri. Damaged trees have been moisture stressed and those topped by power line trimming.

Douglas-fir Beetle is experiencing major increases south of Denver in both the area of the Douglas-fir tussock moth outbreak and the Buffalo Creek fire. (See Schaupp).

No other major problem areas reported. Infestations on the Howerton Hill area of the town of Steamboat Springs appear to have declined.

Spruce Beetle was found in small numbers at scattered locations. A presumed infestation area of significance on the Forbes Trinchera Ranch south of Fort Garland was determined by John Schmid to be declining and only worthy of future monitoring.

Miscellaneous Insect Problems

European Elm Scale is causing significant dieback of American elms in Salida.

San Jose Scale (or near relative) was widespread on aspen in Durango.

A pine needleminer (undetermined species) was reported in Durango.

Flatheaded Appletree Borer caused mortality of several recently-planted silver maples in Haxton on the eastern plains.

DISEASES

Dutch Elm Disease continued at static levels statewide. The only increases reported were from Walsenburg and Trinidad. Total numbers of trees lost for 1996 not available.

Douglas-fir Needlecast reported from the Lake City to Arrowhead area in Hinsdale County. Causal organism not known? (See Anguin)

Winter drying and mortality of conifers reported from southeastern Colorado, particularly from new shelterbelt planting.

"Pinyon Decline" continues to cause various degrees of damage in the Salida and Mancos areas. A number of organisms have been isolated from these trees but no clearcut causal relationship has been established. Moisture stress seemed to be implicated but is difficult to prove.

Hail damage to seedlings planted in "Living Snow Fences" near Byers will likely result in widespread mortality.

Dwarf Mistletoe (various species, but mostly vaginatum) concerns continue to be a significant problem for private landowners, particularly in the Black Forest and along the rest of the Front Range as more and more people move into infested forests and establish residences.

Report by:
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Shade Tree Disease Studies in 1996

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In 1996 we conducted:

1. a second season of determining better IPM procedures for Colorado nurseries
2. a spray trial for control of Pseudomonas bacterial blight on lilac seedlings
3. a study to determine if Cytospora fungi from one tree species can infect another tree species.
4. a survey to determine if the phytoplasma responsible for ash yellows disease is found in the state's green ash.
5. the continued development of our tree and turf research facility.

Results:

1. **Nursery IPM**:

Since the year was dry there was limited damage from foliar diseases.

We collected spores during the growing season from Marssonina, Septoria, and poplar rust leaf spot fungi to find when spores are produced in relation to meteorological variables so preventative measures can be taken. Seems to sporulate w/ rain events

We also have determined how to monitor nurseries for common diseases and will be producing a guide to help nurseries do these activities

2. **Pseudomonas Blight**:

There was no rainfall this spring so the blight did not develop so the trial was a bust

3. **Cytospora Canker**:

We have established elms, aspen, cottonwoods, alder, willow, and green ash to use in the Cytospora pathogenicity and host range test. We have also collected fungal isolates from all these hosts. Inoculation studies will begin in the green house this spring

We have collected %40 of the isolates needed for a companion genetics study of Cytospora that will be conducted in conjunction with Gerry Adams of Michigan State.

4. **Ash Yellows**:

We found the phytoplasma responsible for ash yellows in many green ash trees in all sites sampled around the state. We are waiting for data analysis from our state and other states before we decide what these findings mean.

found lots!

Plans for 1997:

1. Continue to develop the tree and turf research site.
2. Complete Cytospora pathogenicity and genetics studies
3. Continue nursery IPM studies and write up monitoring guides
4. Develop a tree and shrub disease identification and management guide for use by arborists, nurseries, and homeowners.
5. Find funding for the above activities.

Forest Tree Disease Studies in 1996
Dr. Bill Jacobi and Graduate Student Melanie Kallas

In 1996 we conducted:

1. in cooperation with Forest Health Management, US Forest Service, a second season of Armillaria incidence survey plots in the Black Hills NF.
2. the development of stochastic spatial models that can predict the probability of locating diseased trees on randomly located 10 km circular plots in the Black Hills. These models used geographic location of known disease occurrence, elevation, rainfall, site index, aspect and percent slope.
3. tested Armillaria isolates from the Black Hills for species identification and found all of them to be *A. ostoya*.

In 1997 our plans are to:

1. in cooperation with Forest Health Management, US Forest Service, continue to look at 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. Analyze 1995 and 1996 Armillaria survey data.

3. Develop a research project on black stain root disease of pinyon pines in southwest Colorado. We will be looking at vector relationships and spatial relationships with site and management activities (urban development).

4. Find funding for the black stain root disease work and to continue to work on spatial relationships of Armillaria, bark beetles and fire in the Black Hills.

Publications:

Guyon, J. C., Jacobi, W. R., and McIntyre, G. A. 1996. Effects of environmental stress on the development of Cytospora canker of aspen. Plant Dis. 80:1320-1326.

McIntyre, G. A., Jacobi, W. R., and Ramaley, A. W. 1996. Factors affecting Cytospora canker occurrence on aspen. J of Arboriculture 22:229-233.

Kallas, M. A., Jacobi, W. R., Reich, R. M. and Lundquist, J. E. 1996. Use of geographic information systems to study Armillaria root disease distribution in the Black Hills. Phytopath. 86: 102 Supplement, Abstr.

Kallas, M. A., Reich, R. M. and Jacobi W. R. 1996. Hazard rating model for Armillaria root disease in the Black Hills National Forest. In: Proceedings of the 44th Annual Western International Forest Disease Work Conference. Abstr.

SUMMARY OF INSECT AND DISEASE CONDITIONS IN WYOMING 1996

Insects

Mountain pine beetle Populations declined near Edgerton. Data indicate that of 4890 acres originally defoliated in 1993 by the pine tussock moth, 40% died by 1995 of a combination of defoliation and infestation by *Ips* and mountain pine beetle. Number of trees attacked in 1995 by mountain pine beetle declined to 4%, down from 20% in 1993 and 6.4% in 1994.

Statewide, populations increased slightly in the main Medicine Bow and the Black Hills with groups of 50-100 trees.

Ips Very little mortality or top kill was attributed to *Ips* this year due to a cold, wet spring.

Spruce beetle This beetle remains at slightly elevated levels due to spring blowdown in the western part of the state. Spots are scattered and contain only a few dozen trees.

Douglas-fir beetle Fewer private landowners were affected by DFB this year in the Sunlight Basin area than in the past six years. The population appears to be declining.

Pine Sawfly Approximately 600 acres north of Aladdin (NE corner of WY) were heavily defoliated this year. Some 1996 foliage was consumed but most trees produced and maintained 1996 needles. Very few pupae were found while numerous larval cadavers were readily visible. Indications are that the population has collapsed.

Cedar bark beetles Scattered branch dieback over approximately 2500 acres was detected throughout the juniper woodland of Guernsey State Park and adjoining areas.

Gypsy moth No moths were caught in delimiting traps established at the 6 positive catch sites of 1995. Single moths were caught in Sheridan, Cody, and Jackson. At F.E. Warren air force base in Cheyenne, 12 moths were caught: 8 in one trap, 3 in another, and 1 in another. An extensive delimiting project is planned for Cheyenne, while the standard number of delimiting traps will be established at the other three sites in 1997. — ca. 400 traps/yr. in state; Lia puts out ca. 300.

Spider mites One of the biggest urban problems this year was spider mites. Extensive damage in the eastern half of the state was detected in early spring which was halted by a freeze in May. Populations built up again and in August spider mites were once again damaging whole branches. A September freeze halted damage for the year.

Giant conifer aphids These aphids were noticed throughout the state's urban areas on fir and spruce but damage was isolated and is not expected to cause long-term effects.

Ash bark beetles These bark beetles continued to cause significant damage in cities in the western part of the state by killing small diameter branches within the crowns of older trees.

Ash borer Problems from ash borer are slowly spreading west as more green ash is planted and established ash ages.

Bronze birch borer Statewide, cutleaf weeping birch suffers top kill and mortality annually attributed to this borer. Native river birch is reportedly resistant to attack.

Tent caterpillars These insects were common throughout the state in both urban and rural settings on willow, aspen, and cottonwood. Damage in 1996 was scattered and not severe.

Elm leaf beetle This insect caused concern in the western part of the state although long-term impacts are not known.

Grasshoppers High populations of grasshoppers occurred in the northern half of the state. Trees and bushes in some areas were stripped of foliage.

Diseases

White pine blister rust All areas with five-needled pines statewide are known to contain this rust. Branch killing and some tree mortality in limber pine is occurring from blister rust on Casper mountain and northwest of Cody; rust, dwarf mistletoe and *Ips* combined are causing scattered mortality in the forested areas around the Medicine Bow NF.

Subalpine fir decline Subalpine fir across the state continue to suffer mortality from a variety of causes due to older, crowded, decadent fir stands which historically were not as prevalent as they are now. Cytospora, western balsam bark beetle, and Armillaria root disease have all been found in association with dying trees in varying amounts. Decline appears to be tapering off in part due to most of the susceptible firs having already died.

Cytospora canker Aspen and cottonwood are susceptible to Cytospora statewide and this disease prompts the removal of many trees every year. Many infections can be traced to infected nursery stock which may not show obvious symptoms for a year or two.

Nebraska Report to the Great Plains Tree Pest Workshop
April 30 - May 1, 1996
North Platte, NE

Mark Harrell
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1995 Activities

1. Survey of Sphaeropsis blight and pine tussock moth in the Pine Ridge

Aerial and ground surveys of the Nebraska Pine Ridge were conducted to detect, delineate, and evaluate areas of ponderosa pine, *Pinus ponderosa*, killed or damaged by Sphaeropsis (Diplodia) blight, *Sphaeropsis sapinea*, and the pine tussock moth, *Dasychira grisefacta*. Sphaeropsis blight severely damaged about 7,000 acres of trees in 1993. The tussock moth heavily defoliated about 2,000 acres the same year.

Chadron State Park was one of the two areas most heavily damaged by Sphaeropsis blight in 1993. The other area was USDA Forest Service property one to four miles to the east. By 1995, many trees in the park in high-use areas that had been heavily damaged or killed by the infection had been removed. The only trees within the park that were found to have any branch tips killed by Sphaeropsis in 1995 were those that were heavily damaged by the disease in 1993. No new infections were found on trees with moderate, low, or undetectable previous infections. It appeared that the disease was not spreading into additional trees and that the trees with moderate to low levels of infections were recovering. It is believed that the outbreak was initiated by a series of hail storms in the area earlier in the year.

From the air, numerous scattered dead trees could be seen in the park and on USDA Forest Service property to the east. Most of the trees in the two areas, however, showed significant improvement compared to last year. Other areas of the Pine Ridge damaged by the 1993 infections were undetectable from the air.

Another area 12 miles southeast of Crawford was damaged by Sphaeropsis blight in 1995. Approximately 120 acres of trees were heavily damaged and 400 acres were moderately to lightly damaged as detected from the air. The total land area involved, including nonforested areas, was approximately 5 square miles. From the on-site examination of the heavily damaged area, about one-third of the trees were so heavily damaged that they were expected to die from the disease, about one-third had substantial dieback from the disease but were expected to survive, and about one-third showed little or no damage. Most of those with little or no damage were younger trees within the stand. In some areas nearly all the trees were killed, especially along the edge of the stand.

The area southeast of Crawford had been damaged by hail on June 22, 1995. The trees most damaged by Sphaeropsis blight were generally the most exposed and therefore the ones most likely to have received the greatest damage from the hail, i.e. those in the upper canopy and those along the edge of the stand. By August 22, salvage operations had begun to remove the dying and heavily damaged trees.

No sign of feeding damage from the tussock moth was apparent from the air in any of the areas infested by the insect in 1993. Most of the trees with diameters if 10 inches or greater in the infested areas were harvested in 1994.

2. Shoot and stem borers and galls in ponderosa pine (with Mary Ellen Dix) w/ Med Klepenstein

Six seed sources in two 25-year-old ponderosa pine provenance plantings in Hastings, NE and Alliance, NE were evaluated for abundance of *Rhyacionia bushnelli*, *Retinia metallica*, *Dioryctria* spp. borers, and *Peridermium harknessii* (western gall rust). Seed sources were selected based on superior growth and previous susceptibility or non-susceptibility to the insects and pathogen. Infestation levels per tree, per branch, and proportion of tips infested were used to evaluate the influence of source on pest abundance. In both plantings, *R. bushnelli* was less abundant on the three taller sources than on the three shorter sources. The abundance of *R. metallica* did not vary with source. *Dioryctria* borers were more abundant on taller sources. *Peridermium harknessii* gall numbers did not vary with source. Abundance of individual pests showed no correlation with each other.

3. Effects of windbreaks on crop pests and their natural enemies (with Mary Ellen Dix). ≡ sticky-trap data

In 1995 the UNL Agroforestry Team (with M. E. Dix, J. Brandle, R. Case, R. Johnson, L. Hodges, R. Wright, L. Young, and K. Hubbard) analyzed the results of a three-year study examining the effects of windbreaks on the abundance and distribution of crop pests and their natural enemies. Western corn rootworms were significantly more abundant in exposed plots compared to those protected by windbreaks. Numbers of southern and northern corn rootworms and striped cucumber beetles were not different between exposed and sheltered areas. Significantly more lady beetles and parasitic wasps were found in sheltered areas compared to exposed. The results suggest tree shelterbelts do not cause an increase in the numbers of the crop pests studied. Tree windbreaks also may be beneficial to certain natural enemies, such as lady beetles and parasitic wasps. The use of tree windbreaks in agricultural systems, in addition to their known microclimate benefits, appear to provide necessary habitat for natural enemies of crop pests. Greater use of windbreaks may reduce the need for pesticide applications in crop fields.

have other data sets

4. Fabric mulch study

The first year of a two-year study (with Laruie Stepanek and Jim Brandle) of the effects of landscape fabric mulch on the survival and growth of newly planted trees was completed. Trees were planted, treatments were applied, and initial data were collected. Preliminary results suggest, as expected, that some form of weed control, either fabric mulch, wood chip mulch, or herbicide treatment increases survival of tree seedlings. The fabric mulches produced summer soil temperatures generally equal to bare soil and soil with weeds, and higher than soil covered with wood chips. Soil moisture was lowest in soil with weeds, intermediate in soil covered with fabric, and highest in soil with wood chips. Survival and growth measurements taken in 1996 will likely indicate which treatments are most beneficial for trees. The completed analysis of survival and growth, combined with an analysis of the costs associated with the use of fabric mulches, will provide information to landowners and tree-planting agencies concerning the economic value of fabric mulches.

5. Soil treatment for chlorosis

The first-year evaluation of a three-year study (with Phil Pierce, City Forester of Omaha) of a new soil treatment (Micromax fertilizer, sulfur, and NPK fertilizer in 2-inch perforated tubes) for iron chlorosis of trees and shrubs was completed. Initial results on silver maple suggest the soil treatment is beginning to work one year after treatment.

6. Wedgle injector and imidacloprid trunk injections

Trunk injections of imidacloprid (Pointer) applied through ArborSystems' Wedgle injector were evaluated in 1995 for control of the gypsy moth, hackberry lace bug, and sycamore lace bug. Imidacloprid injections were effective in controlling visible damage from lace bugs on hackberry, and resulted in lower numbers of nymphs, but not adults, of the sycamore lace bug. Injections were effective also against the elm leaf beetle in 1993 and 1994. Injections were not effective in killing gypsy moth larvae fed leaves from treated red oaks.

Tests were conducted to look at the initial movement of liquids injected into trees through the Wedgle injector and to examine the amount of mechanical damage caused to the tree. Results with injected safranin dye indicate that 1 ml of liquid injected beneath the bark by the Wedgle injector spreads into an area in the cambial zone about 1 inch wide and 2 inches from top to bottom. The liquid then moves up through the outer xylem and does not go toward the center of the tree farther than the surface of the xylem.

From the size and position of xylem discoloration and the movement of safranin around injection sites that had been made three months earlier, it appears that the separation of the bark from the wood caused by the Wedgle injector does no permanent damage to the tree. Small amounts of xylem discoloration and damaged tissue appear at the center of the injection site, but the discoloration's size of about 1/8 inch wide by 1 inch long is much smaller than the area of bark lifted at the time of the injection. Nearly completely normal xylem is present over the injection site three months later. The pattern of stain around the injection site from safranin injected lower on the tree also shows that the injection has little or no effect on the movement of water through older conducting xylem tissue.

Noteworthy Pests

Pine moths (*Dioryctria ponderosae*, *D. tumicolella*, and *D. zimmermani*) -- Continue to be a problem in young pine windbreaks, Christmas tree plantations, and urban areas across most of the state.

Bronze birch borer -- Has always been a very common and damaging pest of birch in eastern Nebraska. Until last year the borer was almost undetectable in the western part of the state. In 1995, like 1994, over much of western Nebraska, probably 60 to 80% of the birch were dying from infestation by the borer. The outbreak appears to have begun as a result of an early fall freeze in 1991.

Gypsy moth -- Five moths were caught in the state in 1995. All of these were in line with known infested nursery stock locations and a known infested area in Bellevue, just

south of Omaha. The infestation in Bellevue was sprayed May 6 and 13 with Bt by helicopter. Egg mass searches were conducted in the area in '94 and '95. One moth was caught in that area in 1995. (info from Steve Johnson, Nebr. Dept. of Agriculture)

Hackberry lace bug -- Large numbers caused lots of yellowing on hackberry for about the fourth year in a row.

Sycamore lace bug -- Numbers were much higher than usual; caused significant yellowing on sycamore.

European pine sawfly -- Populations were high but probably lower than recent years.

Elm leaf beetle -- Populations were up again, but not like they were several years ago.

Japanese beetle -- Found in larger numbers than usual on nursery stock from Tennessee, and trapped in larger numbers from two infestations in and around Lincoln. Merit is being used to control the local infestations. (info from Steve Johnson, Nebr. Dept. of Agriculture)

Sphaeropsis blight -- Occurring as outbreaks in ponderosa pine in the Pine Ridge following hail injury. Damage was greater than would have been expected in some stands of Austrian pine in eastern Nebraska in 1994 and 1995, possibly because of stress placed on the trees by the late summer flooding of 1993.

Dutch elm disease -- Incidence of the disease was much greater in 1995 than in recent years.

Cercospora blight -- Continues to be a problem throughout the eastern half of the state, especially on Rocky Mountain juniper.

Activities planned for 1996

Ash yellows project
Survey Sphaeropsis blight in the Pine Ridge
Continue fabric mulch study
Continue chlorosis soil treatment study
Continue evaluation of Wedgle injector
Test efficacy of nematodes for control of pine moths
Develop artificial diet for pine moth larvae
Collect and identify parasites of pine moths

THE STATE OF WYOMING

Wyoming State Forestry Division

1100 WEST 22ND STREET CHEYENNE, WYOMING 82002

February 27, 1996

Mark Harrell
Department of Forestry, Fisheries, and Wildlife
Nebraska Forest Service
101 Plant Industry
Lincoln, NE 68583-0814

Dr. Harrell,

Dan Perko forwarded the information on the Great Plains Tree Pest Workshop to me. I am the state forestry entomologist. I am sorry but I will be unable to attend the workshop in April, we have very limited out of state travel at this point in our fiscal year.

I am enclosing a copy of our 1995 conditions report. My main area of work is in forested lands. I understand that your primary interest is in urban/windbreak problems and while most of my report is on forested situations, I hope it will suffice. I have collaborated with both Dan Perko and Mark Hughes to give you information on our urban/windbreak areas.

Please be sure to forward me the reports from other attendees.

Sincerely,

Lia H. Spiegel
State Forestry Entomologist

SUMMARY OF INSECT AND DISEASE CONDITIONS IN WYOMING 1995

Forested Areas
Insects

Mountain pine beetle 500 red/3000 green infested ponderosa 35 miles west of Laramie on northeast side of Deer mountain on east edge of the Medicine Bow NF on private land. Small groups of ponderosas fading in Laramie Peak area where in past few years faders have been restricted to single trees. A few scattered faders in Wyoming side of the Black Hills.

Spruce beetle Wet spring snows accompanied by winds resulted in blowdown throughout the state. Spruce beetles were found in spruce blowdown on state and private land near Sunlight Basin.

Douglas-fir beetle Wet spring snows resulted in blowdown of Douglas-fir on the western side of the state. Douglas-fir beetle was found in several Douglas-fir blown down on state land near South Pass.

Ponderosa pine tussock moth No activity observed in the state.

Douglas-fir tussock moth No activity observed in the state.

Pine engraver beetles (*Ips*) *Ips* beetles continues to kill many single ponderosa pines in the Black Hills probably due to year round logging and slash generation which keeps populations unnaturally high.

Pine sawfly No activity observed in state.

Western pine tip moth This insect continues to cause damage to ponderosa in areas of regeneration in the Black Hills.

Twig beetles Present in sapling ponderosa in Black Hills both alone and in the presence of *Ips*.

Western spruce budworm No damage detected.

Gypsy moth Six males were caught statewide in Laramie, near Dubois on USFS land, in Wilson (near Jackson in Teton Co.), in Ten Sleep, and in Yellowstone National Park at Grant

Village and Look-out Point. No moths were caught in delimiting traps deployed in areas of 1994 catches.

Diseases

White pine blister rust is causing branch, top and tree mortality of limber pine on Dead Indian Hill northwest of Cody, up to 800 acres affected. Branch and top mortality of limber pine is occurring on the north side of Casper Mountain and in the Shirley mountains.

Aspen foliage disease *Marssonina* leaf blight was widespread in the main Medicine Bow NF and adjoining state and private lands in south-central Wyoming causing premature discoloration of foliage.

Cytospora canker This disease is causing the decline of aspen and cottonwood in urban areas, particularly in the southwestern portion of the state.

Fir broom rust This disease is common on subalpine fir in south-central Wyoming on state and private land adjoining the Medicine Bow NF. Some areas have a high incidence of this disease with much of the regeneration affected.

Subalpine fir decline

Areas of subalpine fir mortality were detected on the northern edge of the main Med Bow on private land, up to 160 acres affected. Small patches of subalpine fir mortality were detected on Casper mountain. The aerial detection maps for the Bridger-Teton NF show subalpine fir mortality at epidemic levels, greatly increased from 1994. Ground checks conducted by the Ogden Forest Health Protection office (USDA) yielded western balsam bark beetles, twig beetles, Scolytids, Armillaria, Annosus, and Cytospora present in many trees but many had no discernible cause of death. Environmental factors such as drought or excessive moisture also likely play a role.

Chemical damage continues to cause tree mortality in both urban and forested situations.

Urban Areas

Insects

Ash/Lilac borer For the past several years ash borer in green ash has been a problem in the northeastern part of the state. Now it is appearing further west and is becoming a serious pest in the central part of the state. Green ash was widely and somewhat exclusively planted to replace the American elms which succumbed to Dutch elm disease. As these trees grow into the size class susceptible to the borer, urban areas are sustaining serious damage.

Ash bark beetle This insect is reported in scattered areas throughout the state. Because it is limited to limbs of small diameter, dieback attributed to this insect is probably underreported.

Frost damage

In the southeastern part of the state the very warm temperatures in September suddenly dropped below freezing in the middle of the month. Many new ponderosa pine plantings were killed. Damage to deciduous plantings has not been detected yet.

4/26/96

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

REPORT TO THE GREAT PLAINS TREE PEST WORKSHOP
NORTH PLATTE, NE
APRIL 30 - MAY 1, 1996

Organization

Permanent Staff: David W. Johnson, Center Leader and Supervisory Plant Pathologist
Willis C. Schaupp, Entomologist
Erik Johnson, Aerial Survey Specialist

Service Area: Colorado east of the Continental Divide and northwestern Colorado
All of Kansas
Southern Wyoming east of the Continental Divide (generally south of Casper).

Functions: Provide technical assistance on forest pest problems and forest health issues to federal land management agencies (USFS, NPS, BLM, BIA, DOD) and cooperate with state and other federal agencies to provide assistance on state and privately-owned lands.

Office: Located on the Federal Center, Building 20 in Lakewood, Colorado. Mailing address Lakewood Service Center, P.O. Box 25127, Lakewood, Colorado 80225-5127.
Phone: 303-236-9541.
Fax: 303-236-9542.

SUMMARY OF SELECT INSECT AND DISEASE CONDITIONS
ROCKY MOUNTAIN REGION, 1995
Lakewood Service Center

INSECTS

Gypsy moth Lymantria dispar

Each year, detection traps are placed in campgrounds and other sites that have a high likelihood of being introduction sites for the gypsy moth. Several National Forest recreation sites and the Air Force Academy at Colorado Springs were sampled for gypsy moth during the summer of 1995. Two to three traps were placed at each of 14 sites, for a total of 32 traps. Ten traps were placed at the Air Force Academy. All traps were retrieved. One gypsy moth was caught at the Air Force Academy. Trapping will be intensified in 1996 at this site.

The sites were selected on the basis of elevation, presence of hardwood species, and potential for high numbers of out-of-state visitors. The gypsy moth survey is an attempt to discover gypsy moth "hitch-hikers" which escape from vehicles used by out-of-state visitors. We are going to re-examine the

criteria and selection of sites in coordination with personnel responsible for gypsy moth detection in Colorado including the Colorado State Forest Service, and USDA APHIS, in Colorado and PPQ Office, Wyoming; therefore, sites selected for 1996 may differ from 1995.

Douglas-fir tussock moth Orgyia pseudotsugata

The infestation of the Douglas-fir tussock moth, Orgyia pseudotsugata, that was reported on the South Platte Ranger District, Pike National Forest, spread to an additional 1,700 acres in 1995 in the northern portion of the infestation. The population of feeding larvae was very high. Continued ground monitoring and aerial surveys of the infestation in 1995 indicates a collapsing population in 1996.

In addition to the direct effects of defoliation on the trees, it was noted in scattered areas of the original infestation area that Douglas-fir bark beetle, Dendroctonus pseudotsugae, activity is increasing. Some mortality of trees can probably be attributed to the combined effects of defoliation and bark beetles. Douglas-fir beetle mass attacks were noted in 1995 upon trees that had been completely defoliated in 1994. This situation will be closely monitored in 1996, as epidemics of Douglas-fir beetle have been known to follow Douglas-fir tussock moth outbreaks.

Douglas-fir tussock moth infestations collapse suddenly, usually due to a naturally-occurring, host-specific virus that develops in the population. Dead larvae with classic symptoms of virus infection were observed in 1995, as well as a number of parasitic insects that attack Douglas-fir tussock moth.

Historically, the Douglas-fir tussock moth has not been a significant pest in the forests of the Rocky Mountain Region; however, it is a major defoliator of dry-land interior forests in other western regions of North America. Virtually all reports of damage by this insect in the Rocky Mountain Region have come from suburban landowners in the Denver, Colorado Springs and Cheyenne areas. Curiously, a major host is ornamental spruce in these settings; spruce has not been known as a preferred host in wildland forest situations. Only three previous outbreaks of the insect have been reported in wildland forested areas in Region 2.

Previous outbreaks of the Douglas-fir tussock moth have occurred on the Pike National Forest and adjacent lands. The first report was an outbreak on Cheyenne Mountain near Colorado Springs in 1937. It was reported that practically all Douglas-fir and white fir were killed on 150-200 acres. The next reported outbreak was in 1947 at Evergreen, Colorado. The severity is unknown, but the area was treated experimentally with DDT from the ground in 1947 and aerially upon 100 acres in 1949.

Detection surveys using pheromone-baited sticky traps were conducted in 1975 and 1976 in the forested areas along the Colorado Front Range and in a few towns in central and southwestern Colorado. In 1977 the trapping was expanded to include seven sites in Wyoming. Although moths were captured at many trapping sites, no areas of defoliation were discovered. In 1982, several individual ornamental blue spruce in Evergreen, Conifer and Shaffer's Crossing, Colorado were defoliated. These isolated occurrences were adjacent to thousands of acres of susceptible natural stands of Douglas-fir, yet they were not affected by the insect.

During 1983-1985, several small stands of Douglas-fir were severely defoliated along the Platte River drainage on the Pike National Forest. The area around

Saloon Gulch, east of Kelsey Campground, was particularly heavily defoliated. Recent examination of these areas indicates that some tree mortality did result. A concurrent epidemic of the western spruce budworm, Choristoneura occidentalis, masked some Douglas-fir tussock moth activity in the area.

Following the 1983-1985 infestation, an intensive monitoring of populations was initiated and continued through 1990 using an early warning system of weakly baited pheromone traps and cryptic shelters. No conclusions were reached from this effort since the numbers of moths and other life stages trapped were very low and no defoliation was noted until the recent infestation in 1993.

The current infestation is the largest that has been recorded. The reasons for this are somewhat speculative; however, since the selective harvest of large ponderosa pine and the exclusion of fire from our Front Range pine ecosystem, Douglas-fir has invaded sites historically occupied by ponderosa pine, which is not considered a host species of the Douglas-fir tussock moth. The recent outbreaks of the Douglas-fir tussock moth and the western spruce budworm, another insect dependent upon Douglas-fir as a host, have been of greater intensity and covered larger areas than in the past. It is predicted that these insects will continue to plague us until these ecosystems are brought back to a more natural state.

A pine tussock moth Dasyshira grisefacta

From 1991-1993, this usually unnoticed insect reached epidemic densities and defoliated ponderosa pines at sites in Montana, South Dakota, and Nebraska. A general impression is that these sites are all somewhat marginal for ponderosa pine. Substantiating this is the fact that in the Black Hills ponderosa pine ecosystem, only the extreme southern portion had any pine tussock moth activity. At that site, 40% pine mortality on two similar-sized patches totalling about 340 acres was attributed to the direct and indirect effects of pine tussock moth defoliation.

Four impact plots were installed in central Wyoming near Midwest/Edgerton in 1993. Each plot consisted of 25 pines representative of forest conditions; at two sites, defoliation was evaluated at about 50% and at two sites, defoliation was evaluated at over 90% in 1993. No defoliation has occurred since 1993, as the pine tussock moth population collapsed completely during the winter and/or spring of 1993/94. Measurements made in the fall of 1995 revealed no mortality in the moderately defoliated plots and mortality of 72% and 80% in the two heavily defoliated plots. Only 60% of the dead trees had been attacked by tree-killing bark beetles, primarily Ips. It was concluded that additional factors including the direct and indirect effects of defoliation were responsible for the observed mortality.

A chain-wide strip cruise within the area defoliated in 1993 was performed by Lia Spiegel, Wyoming State Division of Forestry, and George Ivory, University of Wyoming, in the winter of 1996. Their survey covered about 5 acres and determined that 30% of ponderosa pines were recently killed or dying.

The only other known epidemic of D. grisefacta was reported from eastern Montana in the mid-1960s. Apparently little or no pine mortality was attributed to this outbreak. A report documenting the 1990s outbreak is planned.

DISEASES

Armillaria root disease *Armillaria* spp.

A survey of the biological species of Armillaria present in Region 2 was initiated. This information will be used to develop better root disease management strategies for our various customers. Starting in 1993, diseased wood samples containing *Armillaria* collected from throughout Region 2, were sent to the diagnostic lab at the Lakewood Service Center. The fungus was isolated from the host material and identified to biological species by mating unknown isolates with known tester strains in culture. To date all collections have been identified as *A. ostoyae*. The fungal isolates have been catalogued and kept in cold storage (along with the various tester strains) as part of the Region's fungal reference collection.

Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)

No additional reports of mortality of 2-0 lodgepole pine (*Pinus contorta* var. *latifolia*) seedlings were made at the USDA Forest Service Bessey Nursery in Halsey, Nebraska in 1995. Only on certain seed sources from S/FOS - NF.

AERIAL SURVEY MISSIONS

Aerial surveys for insect and disease detection are performed annually on lands requested by resource managers on the national forest districts and states as well as special project areas for Forest Health Management. Approximately 4 million acres were surveyed in 1995 on 7 National Forests in Colorado, Wyoming and South Dakota. Of that total, 10,000 of the acres surveyed were on state lands, 400,000 acres on private and 150,000 acres on other (non-USFS) federal lands. Some of the more common pests detected include bark beetles, defoliators, root disease centers and areas heavily infested with dwarf mistletoe.

OTHER PROJECTS

Several landscape scale analyses are currently underway by staffs at the Lakewood and Gunnison Service Centers. The intent of these analyses is to portray the risks and impacts of major forest insects and diseases to resource managers. Forests involved include the Arapaho and Roosevelt, Medicine Bow/Routt, San Juan and White River National Forests.

RECENT PUBLICATIONS (as of April 1996)

Angwin, P.A. 1995. Pest Conditions at Crested Butte Mountain Resort, Taylor River/Cebolla Ranger District, Gunnison National Forest, Colorado. USDA For. Serv., Renewable Resources, Rocky Mountain Region Biol. Eval. R2-95-1. 19 p.

Angwin, P.A. 1995. Pest Conditions at Aspen Mountain Ski Resort, Aspen Ranger District, White River National Forest, Colorado. USDA For. Serv., Renewable Resources, Rocky Mountain Region Biol. Eval. R2-95-3. 15 p.

Angwin, P.A., D.W. Johnson, T.J. Eager, E. Smith and W. Bailey. 1995. Piney Analysis Area, Holy Cross Ranger District, White River National Forest- Forest health assessment. USDA For. Serv., Renewable Resources, Rocky Mountain Region Biol. Eval. R2-95-2. 71 p. (In preparation)

Forest Health Management Group. 1995. Forest Insect and Disease Conditions in the Rocky Mountain Region 1994. USDA For. Serv., Renewable Resources, Rocky Mountain Region. 48 p.

Johnson, D.W. 1995. Quercus gambelii Nutt. IN: eds., Schutt, Schuck, Aas, Lang, Enzyklopadie der Holzgewachse, Handbuch und Atlas der Dendrologie (Encyclopedia of Woody Plants). Ecomed Verlag, Landsberg, Germany. 8 p.

Johnson, D.W. 1996. Picea pungens Engelm. IN: eds., Schutt, Schuck, Aas, Lang, Enzyklopadie der Holzgewachse (Encyclopedia of Woody Plants). Ecomed Verlag, Landsberg, Germany (In press).

Johnson, D.W. 1996. Picea engelmannii Parry ex Engelm. IN: eds., Schutt, Schuck, Aas, Lang, Enzyklopadie der Holzgewachse (Encyclopedia of Woody Plants). Ecomed Verlag, Landsberg, Germany (In press).

Johnson, D.W., J.S. Beatty and T.E. Hinds. 1995. Cankers on Western Quaking Aspen. USDA For. Serv., Forest Insect and Disease Leaflet 152. 8 p.

Johnson, D.W. and Y. Wu. 1995. A survey for Melampsora rusts along the Colorado Front Range. USDA For. Serv., Renewable Resources, Rocky Mountain Region Tech. Rep. R2-57. 7 p.

Pasek, J.E. 1995. Rocky Mountain aerial survey program, pp. 22-23. IN: McConnell, T. J. [ed.]. Proceedings: Aerial Pest Detection and Monitoring Workshop, Las Vegas, NV, April 26-29, 1994. USDA For. Serv., Northern Region, Forest Pest Mgmt., Report 95-4, 103 p.

Pasek, J.E. and W.C. Schaupp, Jr. 1995. Emergence and overwintering brood of Douglas-fir beetle six years after the Clover Mist Fire on the Clarks Fork Ranger District, Shoshone National Forest, Wyoming. USDA For. Serv., Renewable Resources, Rocky Mountain Region Biol. Eval. R2-95-02, 17 p.

Schaupp, W.C.,Jr. and J.E. Pasek. 1995. Emergence and overwintering brood of Douglas-fir beetle five years after the Clover Mist Fire on the Clarks Fork Ranger District, Shoshone National Forest, Wyoming. USDA For. Serv., Renewable Resources, Rocky Mountain Region Biol. Eval. R2-95-01, 19 p.

Wu, Y., D.W. Johnson and P. Angwin. 1996. Identification of Armillaria species in the Rocky Mountain Region. USDA For. Serv., Renewable Resources, Rocky Mountain Region Tech. Rep. (In preparation).

Evaluation of Pest and Disease Resistance in Windbreak Trees

Dr. Beverly D. Dow, (701) 667-3006
USDA-ARS Northern Great Plains Research Laboratory
Mandan, North Dakota

Lodgepole Pine

A 15-year study (1980-1994) of Rocky Mountain lodgepole pine (*Pinus contorta* Dougl. ex Loud. var. *latifolia* Engelm.) was evaluated for tip damage from *Petrova luculentana* Heinrich (pine pitch-nodule maker). Twenty-five provenances of lodgepole pine were planted at the Northern Great Plains Research Laboratory in Mandan, ND. *Petrova* damage was assessed as the total number of damaged branch tips per tree. Damage from *P. luculentana* varied among years. Severity of *Petrova* damage (number of damaged branch tips per tree) was minimal in 1989 and 1994. There were no significant differences among provenances in 1986, 1989 or 1994. There were significant differences in 1985 and 1987. Provenances that were susceptible in both years included one from Alberta, one from Saskatchewan, two from British Columbia and one Colorado provenance. Resistant provenances in both years included three from Montana and one each from South Dakota, Colorado, Idaho and Wyoming. A Spearman rank correlation was significant between 1985 and 1987, indicating that provenances tended to be either susceptible or resistant in both years.

Provenances from Montana were best suited for growth in the Northern Great Plains. Four of the five Montana provenances had survival rates of 95% or better and taller than average heights (> 4.4 m. at 15 years). Three of the Montana provenances had superior resistance to *Petrova*. Mortality among all provenances was low after the first two years, and all established trees survived a three year drought (1988, 1989, 1990) when the trees were 9, 10 and 11 years old. The data indicate that long-term survival of lodgepole pine can be predicted two years after planting. Tree height was variable in early years, and selection for height should probably be delayed for five or six years after planting.

Other Species

Data analysis of survival, growth charactistics, insects and diseases of several other species of trees is in progress. Green ash (*Fraxinus pennsylvanica* Marsh.) will be evaluated for resistance to sun scald, ash borer (*Podosesia syringae fraxini* Lugger) and rust (*Puccinia sparganioides*). Incidence and severity of cedar-apple rust (*Gymnosporangium* spp.) in junipers (*Juniperus virginiana* L. and *J. scopulorum* Sarg.) will be assessed. Resistance of *Populus* clones to canker (*Septoria musiva* Peck), poplar borer (*Saperda calcarata* Say) and rust (*Melampsora medusae*) will also be evaluated. An extensive inoculation study of Siberian elm (*Ulmus pumila* L.) has been used to select trees resistant to *Sphaeropsis ulmicola* (Ellis & Everh.) for establishing a seed orchard.

Future of the Tree Improvement Program

At the present time, the president's 1997 federal budget has no funding to continue the Tree Improvement Program at Northern Great Plains Research Laboratory. If funding is not restored before the final budget is passed, this research project will be terminated as of September 30, 1996.

1995 Insect and Disease Report
PFRA Shelterbelt Centre
Indian Head, Saskatchewan, Canada

for

Great Plains Tree Pest Workshop
April 30/96, North Platte, Nebraska

1995 Pest Problems

In 1995 we received approximately 350 inquiries relating to insect and disease pests of shelterbelt trees and shrubs. Most inquiries were received from rural areas of Saskatchewan, with the most common pests being ash plant bug (*Tropidosteptes amoenus*), spruce spider mite (*Oligonychus ununguis*), yellow-headed spruce sawfly (*Pikonema alaskensis*), bronze birch borer (*Agrilus anxius*), poplar bud-gall mite (*Aceria parapopuli*) and poplar leaf diseases (*Melanspora* spp. and *Septoria* spp.).

Summary of 1995 Activities

Woolly Elm Aphid Studies - This is a cooperative project that is funded through the Saskatchewan Agricultural Development Fund and conducted by the PFRA Shelterbelt Centre and Saskatchewan Agricultural and Food. The following summary on the woolly elm aphid (*Eriosoma americanum*) are results for the second year of a three year project.

At Indian Head, Saskatchewan, nymphs from overwintering eggs were first recorded on unfolding American elm leaves on May 11, 1995. Each leaf curl was initiated by an average of 3 stem mothers (range 1 to 25). New generation nymphs were first noted in the leaf curls on June 4, 1995. By mid-June, each infested leaf curl had an average of 184 aphids (range 1 to 870). The first winged aphids were found in the leaf curls on June 18, 1995. Flight period of the winged aphids was monitored using yellow pan traps placed in saskatoon plantations at four locations. Winged aphids were collected in pan traps from mid-June through to mid-July with peak collection occurring during the first week in July. Nymphs were deposited by the winged females on leaves of the saskatoon and then nymphs walked down the stem to the roots. The next generation was produced on saskatoon roots and developed into winged forms to return to American elm in early September. Yellow pan traps were used to monitor the return flight of aphids to American elm. Winged aphids were collected in pan traps from August 26 to October 20, 1995. Once on the elms, the winged females produced wingless sexuals. These sexuals would seek protection in cracks and crevices in the rough bark where mating occurred. After mating, each female would deposit a single overwintering egg.

Seven treatments were tested to prevent woolly elm aphid from establishing on the roots of saskatoon at two sites. Treatments included: two rates of dormant oil; dormant oil and Wintergreen; dormant oil and Dursban; Dursban alone; aerosol Tanglefoot; and aerosol pruning paint. Treatments were applied to the base of seedlings in mid-June, prior to the migration of the aphid to saskatoons. Treated plants were between two and four years old. No treatment significantly reduced aphid infestation rates on saskatoon roots. Phytotoxicity in the form of stem weakening and breakage was recorded on plants treated with aerosol Tanglefoot and high rate of dormant oil.

Eight products were tested for the control of woolly elm aphid on the roots of saskatoon at three sites. The products were applied by either foliar spray, soil injection or drip irrigation. Treatments were applied in late July after the saskatoon berry harvest was complete. Treated plants were between two and four years old. Treatments that provided excellent control of the root aphid while not exhibiting phytotoxicity were Orthene as a drip and a soil injection and Admire as a drip and a soil injection. Both Cygon and Malathion exhibited phytotoxicity when applied by drip irrigation.

Various rates of Cygon were evaluated for control of woolly elm aphid on saskatoon roots. Cygon was tested at two sites at 0.1 ml/L, 0.2 ml/L and 0.3 ml/L, using two application methods; drip irrigation and soil injection. The drip irrigation treatments consisted of 10 L of solution, whereas the soil injection treatments consisted of 2 L of solution. Treatments were applied in early August after the saskatoon berry harvest was complete. Treated plants were between two and four years old. All treatments caused a significant reduction in aphid infestation rates on saskatoon roots except for the soil injection treatment at the low rate of Cygon. Significant phytotoxic damage was recorded for all rates of Cygon applied by drip irrigation.

Fungicide Evaluation for Entomosporium Leaf and Berry Spot on Saskatoon Berry - This was a cooperative project funded by the Minor Use Registration Program and conducted by the PFRA Shelterbelt Centre and Saskatchewan Agriculture and Food. Two studies were conducted, with poor results recorded in both trials due to low disease pressure at the test site. Four products were tested for the prevention of entomosporium leaf and berry spot (*Entomosporium mespili*). The products were tested in various combinations of rates, application dates and number of applications. The only products that tended to reduce disease symptoms were Benlate and Bravo. Kumulus and Funginex did not reduce disease symptoms in comparison to the check. Significant phytotoxic damage was recorded for both rates of Kumulus that were applied five times during the growing season.

Proposed 1996 Activities

1. Repeat life history studies on woolly elm aphid to obtain four years worth of data.

2. Conduct additional insecticide trial on saskatoon seedlings testing Orthene and Admire to control woolly elm aphid.

3. Conduct surveys, life history studies, and insecticide trials of fruit infesting pests on choke cherry.

4. Conduct life history studies of the native elm bark beetle.

5. Conduct a province wide survey for Western-X disease on choke cherry.

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COLORADO STATE FOREST SERVICE
INSECT CONDITIONS REPORT FOR 1995

INSECTS

Major Defoliators

Douglas-fir Tussock Moth (Orgyia pseudotsugata)

West Creek/Sprucewood Infestation- the expected decline/collapse of this 20,000 acre (gross area) infestation apparently occurred. Very little spread from the area infested in 1994. New areas of defoliation were confined essentially to the north portion near Sprucewood. Few private landowners did any treatment, for various reasons (see USFS reports and surveys for further details). Impending increase of Douglas-fir beetle in partially-defoliated trees needs to be closely monitored.

Reports from both Denver and Colorado Springs in ornamentals indicate either static or reduced populations.

No other reports.

Western Spruce Budworm (Choristoneura occidentalis)

Continued moderate to heavy defoliation in the Lake City area.

Long-active population near Salida and Trout Creek Pass declining, probably due to host depletion.

Report of local budworm activity near Ouray.

Gypsy Moth (Lymantria dispar)

Summary report prepared and available upon request.

Positive catch sites* in 1996 (one male):
LaPorte
Kremmling
Boulder (one male in each of two traps)
Air Force Academy
Arapahoe County
Lakewood

*All 1995 catch sites will be delimitation trapped in 1996.

Major Bark Beetles

Douglas-fir Beetle (Dendroctonus pseudotsugae)

Apparently a developing population of unknown scope associated with defoliated tussock moth trees west of Sedalia.

Reported at moderate levels from north-facing hills within the town of Steamboat Springs. This is in conjunction with suspected root disease, other bark beetles, and environmental stresses.

Very few problems with this insect elsewhere on private land at this time.

Mountain Pine Beetle (D. ponderosae)

Reported as increasing from both ponderosa and lodgepole pine areas. Specific sites observed or heard from include:

Ponderosa Pine:
Larkspur
Black Forest
Buena Vista (over 1500 currently-infested trees have been marked this winter on private land west of this town)
Jefferson County
Redfeather Lakes area
Ridgway area

Lodgepole Pine (1995 levels represent 8x increase from 1991:
Eagle County- 1021 currently infested trees found on CSFS surveys this year, 387 in 1994
Summit County- 634 trees vs. 63 in 1994
Grand County- 245 trees vs. 130 in 1994

General feeling is that the warm winters of the past few years plus aging of dense forests is condusive to a general increase. We are not sure if this is the beginning of another major epidemic or just a modest increase of short duration.

Other Insects

Brown-headed Ash Sawfly (Tomostethus multicinctus)

Reduced levels in 1995, probably because of sustained rains during hatch in late spring.

Bull Pine Sawfly (Zadiprion townsendi)

No reports.

Chafer (Diplotaxis obscura)

Less than 1994, but still a few reports of adult swarming/pine defoliation from east of Colorado Springs.

Dusky Sap Beetle (Carpophilus lugibris) — ? nitidulidae —

Reported by Cooperative Extension Service entomologists as causing extensive losses to west slope sweet corn (feeds on tassles, making corn unmarketable). This beetle is associated with bacterial wetwood disease of elms and poplars in nearby windbreaks and other plantings.

Elm Leaf Beetle (Xanthogaleruca luteola)

A "down" year for this insect in most areas, again probably due to excessive rains in late spring-early summer.

Pine Engraver Beetles (Ips spp.)

Populations of Ips calligrapha and I. pini at high levels in the Black Forest (including Parker/Franktown area) and foothills near Sedalia/Larkspur.

Pine Sawflies (Neodiprion spp.)

Population of Neodiprion autumnalis reduced east of Colorado Springs but still caused local defoliation of ponderosa pines near Calhan.

Pinyon Needle Scale (Matsucoccus acalyptus)

Reduced activity east of Buena Vista. Many of the trees in the area infested during 1994 are dying of unknown causes. It is not known if the scale infestation and mortality are connected.

Smaller European Elm Bark Beetle (Scolytus multistriatus)

Populations remain at high levels as a result of the fall freeze of 1991 and will probably continue to do so because of extensive elm breakage during the September 21 snow storm in north-central Colorado (Fort Collins to Denver area, not to include Greeley). Dutch Elm Disease losses were high in the Denver area (800 trees in Denver, 95 in Aurora). Other DED losses of significance were: Sterling 33 trees, Fort Morgan 10, Canon City 40, Pueblo 30.

Spruce Beetle (Dendroctonus rufipennis)

Continued losses evident along I-70 from Idaho Springs to Georgetown, including the Empire area.

Spruce Engraver Beetle (Ips presumably pilifrons)

Causing extensive losses of ornamental CO blue spruce in Greeley, Colorado Springs and Denver area. This is presumably related to the warm winters and moisture stress.

Western Tent Caterpillar (Malacosoma californicum)

Very early hatch this year along the Front Range because of very warm winter. Hatch noted in mid-April in many locations, when May 1-10 would be more normal. Development arrested by rains of six-week duration beginning in early May. Hosts were mountain-mahogany and chokecherry, for the most part. Damage negligible.

Tiger Moth (Lophocampa ingens)

High incidence of tents in tops of pinyon & ponderosa pines, Douglas-fir and white fir in the area of Raton Pass, Boncarbo, Stonewall and the Black Forest: all in south-central Colorado. Some leader mortality noted.

Twig Beetles (Pityophthorus spp. and Pityogenes spp.)

Conspicuous flagging of ponderosa pine in sections of the Black Forest.

Web-spinning Sawflies (Acantholyda spp. in pines, Cephalcia spp. in spruce)

Decreased numbers in 1995, compared with 1994.

Western Balsam Bark Beetle (Dryocoetes confusus)

Reported in increased numbers, usually in association with root pathogens but not always, from north-central Colorado (Steamboat Springs, in particular, in conjunction with Fir Engraver). Also reported in high numbers from the Ohio and Mill Creek drainages in Gunnison County. Actual levels probably much higher than those represented by reports.

Of note, several borers were found in summer 1995 associated with burned lodgepole pines and Engelmann spruce within the burned area at Pingree Park (Hourglass Fire of 1 July 1994). Interestingly, a conspicuous population of two large ichneumon wasps (Rhyssa persuasoria and Megarhyssa nortoni), plus Three-toed, Hairy and Downy Woodpeckers were also found in the burn, parasitizing or preying on the borers, respectively. Following the fire, moose were noted in the Pingree Valley for the first time feeding on understory plants stimulated by the disturbance.

SUMMARY

All in all, a strange year weatherwise, with a very warm winter and early spring, followed by 6 weeks of rain and snow, followed by a fairly hot summer and arrival of a freak September snowstorm and "early" winter. Summer insect activity was generally low and delayed phenologically by 3-5 weeks.

Bark beetle populations continue to build in pines along the Front Range and in the central mountains. High altitude bark beetles, particularly in fir, appear to be at higher levels than at any time in the last two decades. Western spruce budworm remains at inconspicuous levels over much of the state, with local hotspots persisting. The large, unprecedented native forest Douglas-fir tussock moth outbreak south-southwest of Denver is essentially over but has killed Douglas-firs over a few thousand acre area. The extent of any Douglas-fir beetle aftermath remains to be seen. In several urban areas, DED/elm bark beetle losses remain high. In towns with aggressive sanitation programs losses have been tolerable, despite high beetle populations. Seven male gypsy moths were trapped in 1995. No established populations of gypsy moth are know to exist, but infested-plant importation problems (Walmart, nurseries, etc.) and continued heavy human population immigration to Colorado from infested areas continue to be a concern.

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1995 IDENTIFICATION AND DIAGNOSTIC SERVICE ANNUAL REPORT

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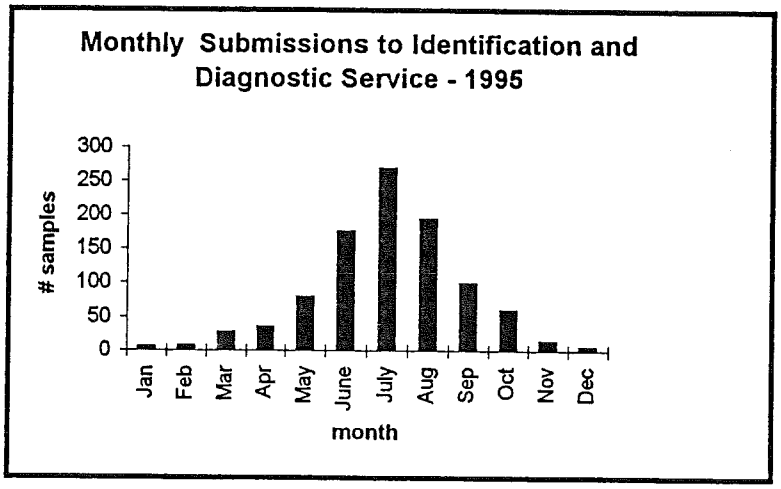
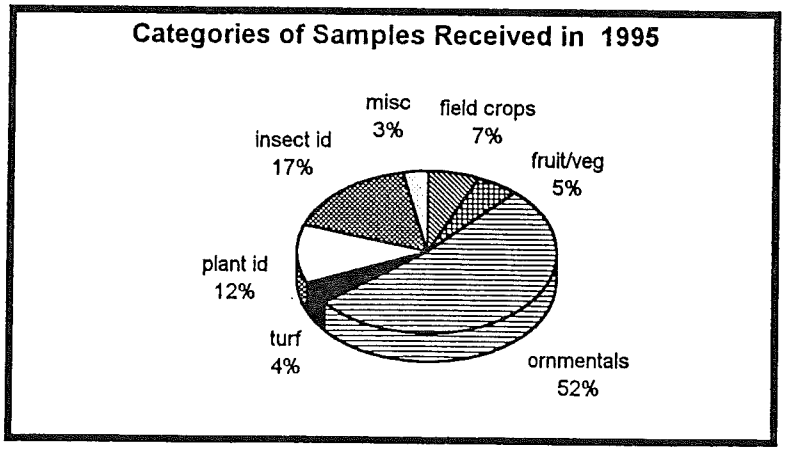
SUMMARY

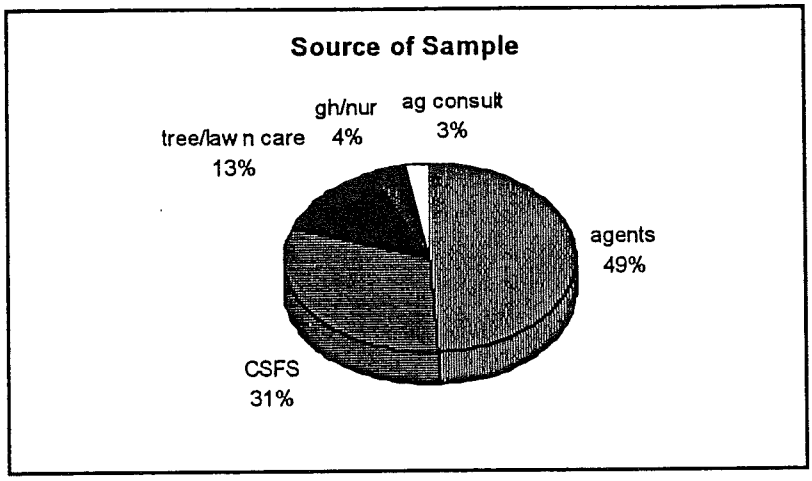
A total of 992 diagnoses and identifications were made by the clinic this year. Of these, 34% were disease, 16% were abiotic, 23% were insect problems and identifications, 12% were plant and other identification, and 15% were undiagnosable or not disease or insect related. As in most years, the majority of samples were received from mid May to late September, peaking in July.



The majority of samples received were ornamentals (woody and herbaceous). Only 7% of the case load was field crops. This shift away from agronomic crops has been the trend for several years.



Cooperative extension and university personnel continue to be the predominant source of samples, accounting for 49%. The Colorado State Forest Service (CSFS) submitted 249 samples or 31% of the case load. The remaining samples came from consultants, arborists, lawn care companies, etc.



Below is a list of counties submitting 30 or more samples. Ten counties, most in eastern Colorado, account for 60% of the samples submitted. A very high proportion of samples (17%) come from Larimer county. Much of this is walk-in insect identifications.

county	# samples
Boulder	84
Chaffee	33
El Paso	50
Fremont	71
Jefferson	30
Larimer	168
Logan	64
Morgan	30
Routt	36
Weld	33

Response time has been good (10 days or less = 91%, 6 days or less = 77 %, 3 days or less = 52%). Culturing for pathogens and identifying plants (and getting control recommendations) account for the high percentage of samples (48%) requiring more than 3 days turn-around time.

Table 1. Number of samples submitted by Colorado counties and other states.

County	# samples submitted
North Central District	
Adams	20
Arapahoe	24
Boulder	84
Denver	11
Douglas	8
Grand	1
Jackson	5
Jefferson	30
Larimer	168
Logan	64
Morgan	31
Sedgewick	9
Summit	14
Weld	33
Golden Plains Area	
Kit Carson	13
Phillips	2
Washington	12
Yuma	10
Northwest District	
Gunnison	4
Moffat	14
Rio Blanco	6
Routt	36
Intermountain Area	
Eagle	8
Garfield	10
Pitkin	8
Tri River Area	
Delta	2
Mesa	13
Montrose	29
Ouray	4

County	# samples submitted
South Central District	
Chaffee	33
Elbert	2
El Paso	50
Fremont	71
Huerfano	7
Las Animas	21
Lincoln	2
Park	2
Pueblo	23
Teller	2
Southeast Area	
Baca	2
Cheyenne	1
Crowley	6
Otero	22
Prowers	5
Southwest District	
Dolores	12
Montezuma	7
San Luis Valley Area	
Alamosa	5
Conejos	1
Costilla	1
Rio Grande	5
Saguache	1
Out of State	
Alaska	1
Nebraska	10
Wyoming	5

SPECIFIC INSECT AND DISEASE PROBLEMS

The prolonged wet spring had quite an impact on pests and diseases. Some insects started unusually early (tent caterpillars), others were devastated (brown-headed ash sawfly), and some were favored by the spring weather (false chinch bugs, biting flies). Overall, most insect life cycles were disrupted and shifted (scales, borers, spider mites).

Bacterial and fungal diseases were much more prevalent this year. Bacterial blights and leaf spots (*Pseudomonas syringae, Xanthomonas campestris*) were widespread on buffaloberry, lilac, plum, lettuce and wheat. Fungal leaf blights and spots were especially bad on ornamentals. This included *Marssonina*, *Venturia*, *Taphrina*, and *Gnomonia*. Field crops seemed less affected.

Dutch elm disease reports increased dramatically over past years. Hundreds of trees were removed in the Denver metro area. Of the 270 samples submitted to us from around the state, 179 tested position (66%).

Table 2. Results of testing for Dutch elm disease by counties in 1995.

county	# positive	# negative	# submitted	% positive
Adams	1	0	1	100
Arapahoe	5	2	7	71
Boulder	6	31	37	16
Crowley	0	2	2	0
El Paso	5	3	8	63
Fremont	64	4	68	94
Huerfano	3	3	6	50
Larimer	6	13	20	30
Las Animas	7	1	8	88
Logan	34	20	54	63
Morgan	10	4	14	71
Otero	11	2	13	85
Phillips	1	0	1	100
Pueblo	20	1	21	95
Weld	6	4	10	60
total	179	91	270	66

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

REPORT TO THE GREAT PLAINS TREE PEST WORKSHOP
NORTH PLATTE, NE
APRIL 30 - MAY 1, 1996

Organization

Permanent Staff: Judith Pasek, Center Leader and Supervisory Entomologist
Kurt Allen, Entomologist
Jeri Lyn Harris, Plant Pathologist

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

Functions: Provide technical assistance on forest pest problems and forest health issues to federal land management agencies (USFS, NPS, BLM, BIA, DOD) and cooperate with state and other federal agencies to provide assistance on state and privately-owned lands.

Office: Co-located with the Rocky Mountain Forest and Range Experiment Station, 501 E. St. Joe, South Dakota School of Mines & Technology, Rapid City, South Dakota 57701-3995.
Phone: 605-394-1960. FAX: 605-394-6627.

STAFF CHANGES

Bill Schaupp left the Rapid City Service Center to join the Lakewood Service Center in July 1995. Kurt Allen joined the Rapid City Service Center in February 1996 to fill the entomology vacancy. Jeri Lyn Harris completed her master's program in August 1995 and was converted to permanent status and promoted in December 1995.

HIGHLIGHTS OF RECENT AND PLANNED ACTIVITIES

1. **Gypsy moth surveys**--Each year, detection traps are placed in campgrounds and other sites that have a high likelihood of being introduction sites for the gypsy moth. In 1995, the Rapid City Service Center coordinated the deployment of 66 detection traps on federal lands in South Dakota and 40 detection traps on federal lands in northern Wyoming. One gypsy moth was caught in a trap located at the Falls Campground on the Wind River Ranger District of the Shoshone National Forest near DuBois in western Wyoming. A delimitation survey is planned for 1996 in that area.

Cooperating agencies reported a number of catches of gypsy moth in traps, primarily located on private lands, during 1995. South Dakota had eight moths, five of which were found in private campgrounds in the Black Hills. No moths were caught at the Hart Ranch Resort south of Rapid City for the first time in four years. Viable egg masses were detected on nursery stock received from Michigan, but no moths were caught in delimitation traps located at the affected retail outlets. For Wyoming, an additional five gypsy moths were reported found in Laramie, Wilson, Tensleep, and Yellowstone Park. In Nebraska, 7 moths were caught in three communities in the east. Only one moth was caught in Bellevue following a spray program.

2. **Aerial detection surveys**--Aerial surveys were conducted by Erik Johnson (Lakewood Service Center) to detect tree mortality and defoliation caused by insect and disease agents in the Black Hills National Forest and the Clarks Fork and Wapiti Districts of the Shoshone National Forest during 1995. Tree mortality caused by mountain pine beetle and Ips bark beetles almost doubled from 1994 in the Black Hills, but was generally light across most of the forest, with damage concentrated in five separate areas. The outbreak of Douglas-fir beetle on the Shoshone National Forest decreased slightly in terms of numbers of trees killed to an estimated 4,542 trees, but expanded to 1,723 acres. Tree mortality declined to about half as many trees within the original area of infestation, suggesting that stands are becoming depleted of suitable hosts after seven years of being attacked. The infestation is moving through stands of Douglas-fir located farther away from the 1988 fire boundary.

3. **Project analyses**--Mountain pine beetle activity appears to be increasing from the low levels of 1994 in several areas of the Black Hills National Forest. We are planning ground surveys in portions of project areas to assess current infestation levels and trends and provide a basis for recommendations to land managers.

4. **Risk rating comparisons for mountain pine beetle in ponderosa pine**--Risk ratings using several methods are being run for several locations in the Black Hills National Forest to compare results. Risk rating systems include that of Stevens, et al., a modification used in the Draft Forest Plan that assumes all stands being rated were single-storied, the PONBUG computer program that was loosely based on Stevens, et al., and an extrapolation of Schmid's recent work. Analyses have been completed for 2 diversity units and analysis of a third project area is being conducted. For the completed analyses, Schmid's rating system produced more stands and acres in low risk and fewer in moderate risk than the other methods. The percent of stands and acreage in high risk did not show a consistent pattern between locations. We hope to display results in a GIS format and complete a report in 1996.

5. **Pest considerations in forest planning**--Efforts have been made to incorporate current knowledge of pest management practices and forest health issues into the revision of the Black Hills Forest Plan. Judy Pasek serves as a member of the interdisciplinary planning team. The Forest Plan is undergoing final revision following a public comment period completed in late 1995. The associated EIS will undergo revision as new model runs are completed. Once approved, the final plan will guide management activities on the Black Hills National Forest for the next ten year interval. The Nebraska National Forest is just beginning the process of revising their forest plan and is incorporating grasslands portions of the Custer and Medicine Bow/Routt

National Forests into a Northern Great Plains land management plan. Jeri Lyn is assigned to an extended planning team to provide input and technical assistance regarding insect and disease concerns in woody draws and riparian areas and regeneration problems in both forests and grasslands.

6. **Monitoring Douglas-fir beetle outbreak**--Monitoring of the Douglas-fir beetle outbreak that followed the Yellowstone fires is continuing on the Clarks Fork RD of the Shoshone National Forest. There are no signs of the infestation letting up yet. Fall brood sampling indicated there are still healthy levels of reproduction and survival. Plans are to continue monitoring on a yearly basis throughout the course of the epidemic.

7. **National Forest Health Policy**--Judy was appointed to a national team to develop a policy on forest health for the USDA Forest Service. The policy is near completion after nine months of work and is expected to be issued soon as an interim directive in the Forest Service Manual under a 1000 file designation, right behind the Forest Service Mission statement.

8. **Miscellaneous technical assistance**--We expect to be involved in a number of smaller projects this year including assistance in the ash yellows survey on the Plains, creating wildlife snags through fungal inoculations, involvement in releases of insect biocontrol agents for canada thistle, survey of white pine blister rust in Wyoming, revisits to blowdown areas in the Bighorns, and pre-fire surveys for Armillaria.

TECHNOLOGY DEVELOPMENT PROJECTS

1. **GIS-Based Landscape-Scale Root Disease Hazard Rating System**--This technology development project is being conducted in cooperation with Colorado State University to develop a hazard rating system for Armillaria root disease in the Black Hills. Over 40 miles of chain-wide transect lines were surveyed by RCSC and CSU field crews to collect recent incidence data. Graduate student Melanie Kallas and CSU professors R. Reich and W. Jacobi are developing a rating system by coupling past and recent data on Armillaria root disease occurrence with SCS soil classifications, stand inventories, site disturbances, habitat types, and meteorological data in a GIS data base. The CSU cooperators are currently analyzing the data base using a statistical spatial approach to develop the Armillaria root disease hazard rating system.

An additional objective of this study was to examine Armillaria clonal distribution and identify the Armillaria species found in the Black Hills. Fifty Armillaria specimens were isolated and cultured throughout the field season. They are currently being tested using vegetative compatibility tests to locate possible clones. The isolates are also being paired with North American Biological Species tester isolates of Armillaria for species identification.

The project will continue this next year by collecting data on Armillaria occurrence for another 30 miles of transects. Final data analysis and project completion will be done during winter months of '96 and '97.

2. **Pest Trend Impact Permanent Plots for Comandra Blister Rust in Wyoming**--Permanent plots were established in 1982 - 1986 to study the effects of

Comandra Blister Rust on lodgepole pine stands of the Bighorn, Medicine Bow, and Shoshone National Forests. Twenty-four of these plots were resurveyed in 1995 and the data collected is currently being tested in mortality and growth loss models for this rust. Preliminary results support previous findings that tree growth is not severely impacted by comandra blister rust infection until the tree has been top-killed by a girdling stem canker. Growth slows dramatically after topkill and tree mortality usually occurs within 5 to 15 years depending on the amount of topkill.

Seven more previously-established permanent plots will be surveyed in summer of '96 and data from all 31 plots will be stored in the national PTIPS database. A technical report on lodgepole pine growth and comandra blister rust associations is currently being prepared.

3. **Risk-rating for Douglas-fir Beetle**--This study transferred with Bill Schaupp to the Lakewood Service Center in order to ensure continuity.

RECENT RCSC PUBLICATIONS

Pasek, J.E. and W.C. Schaupp, Jr. 1995. Emergence and overwintering brood of Douglas-fir beetle six years after the Clover Mist Fire on the Clarks Fork Ranger District, Shoshone National Forest, Wyoming. USDA Forest Service, Rocky Mountain Region, Biological Evaluation R2-95-02. 17 p.

Schaupp, W.C., Jr. and J.E. Pasek. 1995. Emergence and overwintering brood of Douglas-fir beetle five years after the Clover Mist Fire on the Clarks Fork Ranger District, Shoshone National Forest, Wyoming. USDA Forest Service, Rocky Mountain Region, Biological Evaluation R2-95-01. 19 p.

RCSC PUBLICATIONS IN PROGRESS

Berisford, C.W., J.E. Pasek, K.E. Espelie, and M.J. Dalusky. (Draft). Pheromone chemistry, pheromone cross attraction and cuticular hydrocarbons of the sibling pine tip moths, Rhyacionia frustrana (Comstock) and R. bushnelli Busck (Lepidoptera: Tortricidae). Submitted to Canadian Entomologist.

1996 Report - North Dakota
Great Plains Tree Pest Workshop
North Platte, NE, April 30 - May 1, 1996

Report from J.A. Walla, Plant Pathology Dept., NDSU, Fargo 58105
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1. Western gall rust

RAPD analysis was used to examine variation among 8 single gall aeciospore isolates from three sites. Using only bands that were rated "good" (bright, fully repeatable), no variation was found among three isolates from the Horning State Farm in NE, where it appears that the population was derived from a single gall. However, using "intermediate" bands (usually not as bright as "good" bands), a small amount of variation was identified at Horning. Isozyme analysis had found no variation within that site. This result indicates that the fungus may have a mechanism for variation. Variation was found among the other five isolates. More variation was apparent among spores from different sites than within sites. The amount of variation between isolates from the western and eastern subpopulations was at a level that may indicate separate species. (Research with Carol Schumann, USFS, Lincoln)

RFLP analysis was used to examine variation among single gall aeciospore isolates. Variation was found by RFLP analysis among isolates that were designated biotype A based on isozyme analysis. This included variation among isolates from Horning. (Dissertation research by Wang)

2. Lirula needle blight of spruce

Morphological variation was identified among samples from different areas within the US and among samples from different hosts.

Lirula macrospora was found in Montana and North Carolina, new state reports.

3. Ash yellows of green ash

Ash yellows was first reported in the Great Plains in southeast North Dakota (ND) in 1993. Ash yellows has since been confirmed in green ash in other areas of ND and in Montana (MT), Nebraska (NE), and South Dakota (SD). The infected trees included planted and wild trees, each in rural and urban settings. Those in ND, SD, and NE and one MT site were sampled because they had witches'-brooms. Those at the other MT site were sampled because the adjacent trees had severe dieback; the sampled trees at this site consisted of stumps with sprouts. Ash yellows was confirmed in Burleigh and Emmons Counties in south central ND and Billings County in southwest ND; Brookings County in northeast SD and Minnehaha County in southeast SD; Burt County in northeast NE, Butler County in southeast NE, and Garfield County in central NE; and Carbon County in south central MT. Ash yellows was confirmed in one tree in each of these counties except for Carbon County, MT, where four infected trees at two sites were identified. Ash yellows was not confirmed on one additional tree with a witches'-broom at the Brookings County, SD site or on single trees with witches'-brooms at one site

each in Saunders County and Dodge County, NE. The condition of the two infected trees in south central ND appeared to be good, whereas that of all other infected trees was poor, as judged by apparent vigor and extent of crown dieback. These findings extend the known range of ash yellows to the northwest, to the western side of the native range of green ash. (Research with Guo)

4. X-disease of chokecherry (with Cheng and Guo)

A monoclonal antibody raised against X phytoplasma antigen from diseased chokecherry (chch) was developed and tested. It is specific to phytoplasmas in the X phytoplasma cluster, with one interesting exception, and is more sensitive than our previously developed polyclonal antibody, but less sensitive than nested-PCR.

Microinjection of oxytetracycline into chch with X-disease in the spring of 1994 resulted in greatly reduced disease symptoms in the spring of 1995. This was tested to allow fruit production, and thus breeding, on diseased plants, which are normally barren. This might prove useful in orchard or landscape plants.

Aster yellows was discovered in chch in ND, including in plants with dual infections of X-disease and aster yellows (Research with I.-M. Lee, Beltsville, MD). This complicates our research because tests will now be required for the presence of two phytoplasmas and determine the effect of each separately and both together.

PCR and RFLP analyses were used to examine genetic relatedness among X phytoplasma samples from chch in ND, and among ChCh X phytoplasma and the eastern (CX) and western (WX) strains of the phytoplasma. Nested-PCR analysis using primer pairs specific to 16S RNA in the X phytoplasma and RFLP analysis of the 16S RNA and the ribosomal protein genes each indicated that the X phytoplasma in chch is different than the tested strains of CX and WX. No variation was detected among X-phytoplasma samples collected throughout ND.

A chokecherry seed source provenance planting was established in 1983 by the USDA-PMC to identify superior germplasm for conservation plantings, with X-disease resistance as one goal. X-disease symptoms were common in the planting by 1987, and X phytoplasma was confirmed through specific serological and PCR analyses. Disease severity was rated in 1993 and 1994, and selected plants were observed in 1995. By 1994, 44% of the plants had died. Of 1,792 plants surviving in 1994, 18 (1%) had no disease symptoms and 68 (4%) had symptoms, but little damage. X phytoplasma was present in all plants with little or no damage that were assayed, including those with no symptoms. Distribution of these putatively resistant plants in the planting and among seed sources appeared random. These plants appeared tolerant to X-disease because they were infected, but had reduced or no disease symptoms and good vigor from 1993 through 1995, while adjacent plants were severely damaged. (Research with M. Knudson, Bismarck PMC)

5. Unknown juniper disease

Junipers in urban landscapes in Bismarck developed serious dieback problems in 1995. The cause is not known. The Bismarck city forester saw some junipers with similar dieback in 1994. The problem appears to begin as a general thinning of the foliage,

especially inside and on the lower crown, similar to the thinning caused by Cercospora, but Cercospora has not been found. Thinning is followed by the development of twig dieback, again mostly in the lower crown. The twig dieback has the appearance of that caused by Phomopsis and Kabatina, but those fungi have not been found. Twig dieback appears to be followed by dieback down the branch that had the dead twig and by twig dieback of all or nearly all the twigs around the previously dead twig, resulting in an area of dead foliage. The area of dead foliage appears to expand, gradually merging with other areas of dead foliage. Cankers have not been found (no discolored wood or sunken canker margins). The expansion may continue over the entire crown, and many junipers have either died or lost their ornamental value.

Most of the junipers in Bismarck are *Juniperus scopulorum* cultivars. Junipers with the same symptoms were seen in two nurseries in Bismarck and in several nurseries in the Fargo/ Moorhead area. The source of the symptomatic seedlings included at least three wholesalers. Each nursery indicated that the seedlings had no symptoms when they arrived (usually in May), but symptoms developed by sometime in July and continued to worsen. Established junipers with similar problems were seen only in Bismarck.

There are many fungi on the samples that have been examined. A Phoma-like fungus is present on over half of the samples checked. The pycnidia were found on foliage and twigs. Conidia are subglobose, hyaline or slightly melanized, and 4-6 X 5-7 um.

6. "Aspen stunt" (with Cheng)

In October, 1995, severely stunted aspen root sprouts were observed in an aspen site in northeast ND that was logged in 1994. Most of the stunted plants were 8-14 inches tall, while unaffected plants were about 3 feet tall. There were many stunted plants in an area that was conceivably the root extent of one tree. In some cases, there were stunted plants immediately adjacent to nonstunted plants, which might be explained by roots from different trees growing into the same area. There were some stunted plants that were only slightly affected as compared to nonaffected plants.

The pattern of symptoms appeared to fit a phytoplasma disease. The putative symptoms were:

-all plants from roots of a single tree were affected.
-affected plants were stunted due to shortened internodes.
-affected plants had stunted leaves.
-affected leaves were deformed and curled downward.
-some affected plants had multiple shoots at the base or at the tip.
-roots of some affected plants had masses of roots as opposed to occasional feeder roots on nonaffected plants.

Extracts from some symptomatic leaves were assayed for a phytoplasma using a universal phytoplasma probe and SEM was used to observe phloem of leaf vein cross-sections. Phytoplasmas were not detected. Virus-like inclusion bodies were observed in leaf veins of both symptomatic and nonsymptomatic plants.

Completed Citations and Publications Since Last Report:

Cheng, Z.M., Walla, J. A., and Guo, Y.H. 1995. Research to develop X-disease resistant chokecherry. The Windbreak Demonstrator 5

(1,2):8-9.

Dix, M. E., Klopfenstein, N., Rietveld, W. T., Harrell, M., and Walla, J. 1994. Biodiversity can enhance biological control of pests in Great Plains agroecosystems. pp. 37-53, In Proc. Great Plains Agricultural Council annual meeting, Bismarck, ND, June 7-9, 1994.

Guo, Y. H., Cheng, Z.-M., and Walla, J. A. 1996. Analysis of variation in chokecherry X phytoplasma. (Abstr.) Phytopathology 86: (In press).

Guo, Y.H., Walla, J.A., Cheng, Z.-M, and Lee, I.-M. 1996. X-disease confirmation and distribution in chokecherry in North Dakota. Plant Disease 80:95-102.

Walla, J.A. 1995. Axenic culture of pine stem rust fungi. pp. 137-138. In Proc. 1993 Western International Forest Disease Work Conference, Sept. 13-17, Boise, ID.

Walla, J. A. 1995. Ash yellows in the Great Plains. Great Plains Forestry Newsletter of Great Plains Agr. Council-Forestry Committee 23 (3):3.

Walla, J. A. 1995. Studies of *Lirula macrospora* (Hartig) Darker on spruce. Ph.D. dissertation, North Dakota State Univ., Fargo, ND.
Walla, J. A. 1996. Aeciospore formation in *Peridermium harknessii* axenic cultures. (Abstr.) Phytopathology 86:(In press).

Walla, J., and Cheng, Z.-M. 1994. Research to develop disease resistant ponderosa pine. The Windbreak Demonstrator 4:6.

Walla, J. A., Cheng, Z.-M., and Guo, Y. H. 1996. Field resistance of chokecherry to X-disease. (Abstr.) Phytopathology 86:(In press)

Walla, J. A., and Guo, Y. H. 1996 . Ash Yellows in the northern Great Plains region. Plant Disease (In press).

Walla, J.A., and Stack, R.W. 1995. Fungicidal control of Lirula needle blight in spruce plantings. pp. 38-44, In Shoot and Foliage Diseases in Forest Trees. Proc. Joint Meeting of the IUFRO Working Parties *Canker and Shoot Blight of Conifers* and *Foliage Diseases*, Eds., P. Capretti, U. Heiniger, and R. Stephan, June 6-11, 1994, Vallombrosa, Italy.

Walla, J.A., Tuskan, G.A., Lundquist, J.L., and Wang, C. 199-. Expression of inoculum and family specific responses in the ponderosa pine-western gall rust pathosystem. Plant Disease (Accepted 2/96).

Wang, C. 1995. Host/pathogen interaction and pathogen characterization in the ponderosa pine (*Pinus ponderosa*)/western gall rust (*Peridermium harknessii*) pathosystem. Ph.D. Dissertation, North Dakota State Univ., Fargo, ND.

Forest and Shade Tree Pathology Research Activities during 1995-96 and Planned for 1996-97

Bill Jacobi and Graduate Students Melanie Kallas and Jeff Kepley
Department of Bioagricultural Sciences and Pest Management
Colorado State University, Fort Collins, CO 80523 (303) 491-6927

I. Shade Tree Research

1. Jeff Kepley. Cytospora Pathogenicity.

We hope to determine if all the Cytospora fungi found on our different hardwood hosts in Colorado are the same or different species or host preference types. We will be doing inoculation studies at Fort Collins and hopefully genetic analysis will be completed by Gerry Adams at Michigan State. We are looking at Aspen, Cottonwood, Siberian Elm, Alder, Green Ash, and Willow. If anyone can send Cytospora isolates from any of these hosts we would greatly appreciate it.

2. Turf and Tree Research Area:

We are in the process of establishing a new research nursery to study the interactions of irrigation practices, turf, and insect and biotic and abiotic diseases of selected shade trees. We were able to finally find funding to complete the establishment of this facility. The water system is in and we are planting trees now and turf seed in a few weeks. We are planting honeylocusts and green ash. This is a major undertaking and experiment in truly cooperative work with soil hydrologists, turf specialists, entomologists, and pathologists. We'll see how we do. We will be trying to actually get water usage values for one of our more common tree species.

3. We planted Gene Smalley's hybrids this spring.

4. Nursery and Landscape IPM Project:

Whitney Cranshaw (entomologists) and I have a small grant to develop IPM procedures for nurseries and landscapes. This project is off and running starting last summer 1995. We are studying the timing of spore production of Marssonina and Melampsora rust of aspen and poplars as part of this project.. trying to do disease monitoring tied to other phenological events.

5. Pseudomonas Blight of Lilacs:

We are running some copper spay trials at the State Forest Service nursery in Fort Collins this spring to find a control for Pseudomonas blight of lilacs. Is there anyone who has problems with this disease in their state??? = No one said YES =

II. Forest Tree Research

A. Armillaria Root Disease Melanie Kallas M.S. Graduate Student

In cooperation with the U.S. Forest Service, Region 2 FPM, and the Rocky Mountain Forest and Range Experiment Station, we are utilizing GIS to study the occurrence of Armillaria root disease in the Black Hills National Forest. We will be looking at relationships between root disease and soils, past disturbance, and meteorological data. The study is aimed at determining general relationships over the entire hills.

III. Publications

Omdal, D.W., Shaw, C.G., III, Jacobi, W.R. and Wager, T.C. 1995. Variation in pathogenicity and virulence of isolates of Armillaria ostoyae on eight tree species. Plant Dis. 79:939-944.

News Items: We are starting to work on the formation of a combined plant pathology, weed science and entomology department. Tom Holtzer is acting head of the two existing departments since Gary McIntyre stepped down as Department head of Plant Pathology and Weed Science.

Diseases: We had a supper wet and cool spring two months of rain (May and June 1995) so leaf spots on aspen were especially bad, pinyons died from the excess water, and many diseases that we never see were about such as apple scab. We are expecting to see root damage on honeylocusts over the next 12 months.

1996

GREAT PLAINS TREE PEST WORKSHOP

KANSAS STATE AND EXTENSION FORESTRY REPORT

North Platte, Nebraska

GENERAL

The Kansas weather during 1995 was very unusual. A very wet spring was followed by a very dry summer and fall, and the drought continued into the spring of 1996. The big concern is that 1996 may be a very dry year. The spring of 1995 was ideal for disease development, and the reports of disease problems were higher than normal. The dry weather caused some delay in the emergence of some insects, and reports of damage was reported much later than normal.

DISEASE

Anthracnose was as severe as it has been in the last 30 years. Sycamores were hit the hardest, but other species were also affected. Sphaeropsis tip blight continues to move from the urban areas out into windbreaks, recreation plantings, and roadside plantings. The disease is most serious on Austrian and Ponderosa pine.

Pine wilt continues to spread in the eastern part of the state. The big concern is that if the drought continues a lot of trees will be under stress, and pine wilt will spread in 1996. Scotch pine is the major species of concern, but pine wilt has also been found in Austrian and white pine.

INSECTS

Loblolly pine sawfly (*Neodiprion taedae taedae*) has been tentatively identified in 3 northwest Kansas counties. This is the first time the insect has been reported in Kansas. Positive identification hopefully will be made in 1996.

One gypsy moth was caught in a pheromone trap in a housing area on Fort Leavenworth. Additional trapping will be conducted in 1996 on the Fort. A total of 1100 traps were placed at locations across the state in a cooperative effort of state and federal agencies.

Walnut trunk webbing insect (*Gretchena concitatricana*) populations were very low again in 1995 and no webbing was observed. The insect continues to be a major interest, but is not considered a major pest.

Pine shoot beetle (*Tomicus piniperda*) still has not been reported in the state. The State Department of Agriculture continues to check nursery stock, and Christmas trees coming into the state.

Submitted by: Lester R. Pinkerton, Forest Management Program Leader

PONDEROSA AND AUSTRIAN PINE (*Pinus ponderosa* and *P. nigra*)
Sphaeropsis tip blight; *Sphaeropsis sapinea*

* Based on current shoot damage *

N. A. Tisserat and J. O'Mara
Department of Plant Pathology
Kansas State University
Manhattan, KS 66506-5502

FUNGICIDE INJECTIONS FOR CONTROL OF SPHAEROPSIS TIP BLIGHT OF PINES, 1995: Sixteen Ponderosa and six Austrian pines were selected for injection at the Manhattan Country Club, Manhattan, KS. Ponderosa pines were 60-80 years old, 12-24 inches diameter at breast height (DBH), and moderately to severely damaged by tip blight. Austrian pines were approximately 15-20 years old, 8-14 inches DBH, and moderately damaged by tip blight. On 14 Nov 94, four Ponderosa pine trees were injected with the fungicide Alamo. One microinjection capsule, containing 10 ml of Alamo, was used for each inch of trunk DBH. Injections were made as low as possible to ground level at equally spaced intervals around the trunk circumference. Capsules remained on the tree for 1 wk. Four Ponderosa and four Austrian pines were injected with Alamo on 7 Apr 95 as described above. Four other Ponderosa pines were injected with Lynx 1.2EC or water with a modified syringe (Arbor Systems, Omaha, NE) in Nov 94. Briefly, a number of holes (1 hole/inch DBH) were drilled into the cambium around the trunk perimeter with an 11/64 inch drill bit. A modified, flattened needle with a beveled tip was inserted into each drill hole at a slight angle so that it was tangential to the cambium, and 1 ml of Lynx or water was injected. Ponderosa and Austrian pines were grouped in separate randomized complete-block designs with four and three single tree replicates respectively. On 14 Jul 95, 100 shoots on branches throughout the lower portion of each tree crown (< 20 feet in height) were examined for Sphaeropsis tip blight.

Uptake of Alamo in Nov by Ponderosa pines was very slow (> 2 days) and often incomplete. Total fungicide uptake for each tree was variable and difficult to determine because many of the capsules backfilled with resin. Some of the resin was clear, indicating that all of the fungicide (blue) had entered the tree, whereas blue-stained resin in other capsules suggested incomplete uptake. We estimated an average of 60-70% of the fungicide entered injection sites. Uptake of Alamo in Apr on both pine species was similar to that observed in Nov. Injection of Lynx with a modified syringe often resulted in excessive back pressure and leakage of chemical out of the drill hole. No phytotoxicity was noted on any injected tree. Fall and spring injections of Ponderosa pines or spring injections of Austrian pines with Alamo did not significantly reduce tip blight incidence, but Ponderosa pines injected with Lynx in Nov did have a lower (P=0.1) percentage of blighted shoots.

	Treatment and rate	Time of injection[1]	Tip blight %[2]
Ponderosa pine	Water (syringe, 1ml/inch diam)	Nov	27.8a
	Alamo 1.2MC (1 capsule/inch diam)[3]	Nov	25.3a
	Alamo 1.2MC (1 capsule/inch diam)	Apr	26.5a
	Lynx 1.2EC (syringe, 1 ml/inch diam)[4]	Nov	13.5b
Austrian pine	No injection	Apr	34.6a
	Alamo 1.2MC (1 capsule/inch diam)	Apr	23.0a

[1] Injections made 14 Nov 94 or 7 Apr 95. Capsules remained on trees for 7 days.
[2] Percentages based on 100 shoots and four and three reps for Ponderosa and Austrian pines. Data for Ponderosa pine arcsine square root transformed before analysis and back-transformed for presentation. Percentages on Ponderosa pine treatments not followed by same letter are significantly different (P = 0.1).
[3] One capsule, containing 10 ml fungicide, was used for each inch DBH.
[4] One ml of Lynx (1.2EC) was injected per inch DBH.

1995 South Dakota Pest Management Report - John Ball, Forest Pest Specialist, South Dakota State University, Box 2140a, Brookings, SD 57007

Biotic

Hardwood insects

The most often reported pest in 1995 was the **ash plant bug** (*Tropidosteptes amoenus*). Heavy infestations of this insect were reported on green ash throughout the state. While the plant bug population appeared to be down from 1994, many trees suffered partially or, in the case of young trees, complete defoliation. Many of these same trees were found to have heavy infestations of **lecanium scale** (*Parthenolecanium spp.*) This scale was also reported on many American elms and silver maples in eastern South Dakota.

Another commonly reported insect was the **fall cankerworm** (*Alsophila pometaria*). Most of the reports came from along the Missouri River. Heavy defoliation occurred on American elms and hackberries along the floodplain and in several communities that reside along the river. **Fall webworm** (*Hyphantria cunea*) and **mourningcloak butterfly** (*Nymphalis antiopa*) were the other two commonly reported defoliators. Fall webworm occurred statewide, but generally in low populations, while mourningcloak butterfly infestations were heavy but limited to the Mitchell-Huron area. **Elm leaf beetle** (*Pyrrhalta luteola*) reports were down from the previous years. Only scattered infestations were reported.

There were few reports of borers in 1995. **Ash borer** (*Podosesia syringae*) reports came primarily from the northwestern portion of the state but the reports were down from a year ago. Several instances of **ash bark beetles** (*Hylesinus spp.*) infestations were observed in a strip from Aberdeen to Mitchell. **Bronze birch borer** (*Agrilus anxius*) infestations were common on cutleaf European birch trees along the eastern one-fourth of the state.

Conifer insects

Mountain pine beetle (*Dendroctonus ponderosae*) and **pine engraver** (*Ips pini*) were very low during 1995. The most numerous reports were from a **pine sawfly** (*Neodiprion spp.*) infestation that occurred along the eastern side of the Black Hills. This infestation resulted in the partial defoliation of young ponderosa pines in several of the communities surrounding Rapid City. The next most frequently reported insect was **cedar bark beetle** (*Phloeosinus spp.*) on eastern redcedars along the Missouri River. This insect was associated with browning foliage and broken twigs in many young redcedar windbreaks.

Hardwood diseases

The problem with **ash anthracnose** (*Gnomonia aridum*) continued into 1995. While the extent of damage was down from 1994, many communities in eastern South Dakota experienced ash defoliation. Another ash disease, **ash rust** (*Puccinia sparganioides*) was reported in only a limited area of the state. The reports of this disease came from within a 50-mile radius of Mitchell. Within this area, however, defoliation was extensive.

Cedar apple rust (*Gymnosporangium juniperi-virginianae*) and **apple scab** (*Venturia*

inaequalis) were also at very high levels in eastern South Dakota. 1995 was the third year that above-average precipitation fell across the region.

Dutch elm disease (*Ceratocystis ulmi*) continued at the same level as the past year. Communities that have a good DED management program maintained losses at one to two percent.

Conifer diseases

Diplodia tip blight (*Diplodia pinea*) remains a problem on Austrian pines in much of the state. Ponderosa pines in eastern South Dakota have also been infected. **Kabatina tip blight** (*Kabatina juniperi*) continues to be a problem in redcedar windbreaks across much of the state. Browning and dying tips are visible in many belts, but no mortality has been observed.

Abiotic

Cultural

Most young tree failures can be attributed to **planting too deep**. In many urban plantings, trees are routinely planted so that the bud union is several inches below the soil surface, rather than above. In windbreak plantings seedling conifers are planted so the lower needles are buried.

Environmental

Three years of **flooding** has resulted in the loss of mature cottonwoods, green ash along lakes and streams in eastern South Dakota. **Snow damage** was extensive in the Hills this last winter. A heavy early snowfall resulted in many snapped pines throughout the northern Hills.

Unknown

Hackberries in southeastern South Dakota continue to decline. The symptoms begin with midsummer yellowing followed by premature defoliation of one or more branches in the canopy. The next year these branches are dead and the symptoms appear on other branches. Usually the tree dies within three to four years of the original symptoms. Trees affected range from three to 20 inches in diameter

FORESTRY COMMITTEE

GREAT PLAINS AGRICULTURAL COUNCIL

February 27, 1996

MEMO TO: GPAC Forestry Committee Transition Task Force Members; State Foresters; NRCS State Conservationists; USDA Forest Service Representatives; and other Interested Groups and Organizations

FROM: Dan Perko, Chair; GPAC-Forestry Committee Transition Task Force

RE: Draft Review of Proposed "Plains and Prairie Forestry Association" By-Laws

Your response is needed by April 15, 1996

Reply to Dan Perko
GPAC-FC Transition Task Force
C/O Wyoming State Forestry Division
1100 W. 22nd Street, Cheyenne WY 82002

You indicated an interest in the reorganization efforts of the former Great Plains Agricultural Council-Forestry Committee. The Transition Task Force has worked through two generations of draft by-laws. The draft enclosed is for your review and comment. A final draft will be prepared and mailed to all past Forestry Committee members and interested groups, associations and agencies in May.

Final discussion and hopefully adoption of the by-laws is scheduled for our annual meeting in Stillwater, Oklahoma, July 9, 10 and 11, 1996. I hope you or a representative of your agency or organization will attend. Registration information will be mailed this spring.

Thanks to the Transition Task Force for their work.

Thank you for your continued interest in and support of a Plains and Prairie Forestry Association.

DRAFT
February, 1996

BY-LAWS
PLAINS AND PRAIRIE FORESTRY ASSOCIATION

ARTICLE 1. NAME

The name of the organization shall be the "Plains and Prairie Forestry Association".

ARTICLE II. PURPOSE

The purpose of this Association shall be to enhance forestry and agroforestry programs in the Plains and Prairie regions, including conservation and utilization, genetic improvement, pest management, nursery programs, community forestry and wildlife habitat.

ARTICLE III. MEMBERSHIP

Classes of membership are as follows:

1. Individual memberships: Individuals who pay dues at the full rate as set by the Board of Directors.

2. Student memberships: Persons presently enrolled as full-time students at any recognized college, university, or technical school and who pay dues at the student rate as set by the Board of Directors.

3. All classes of membership may attend the Annual Meeting and participate in discussions. Only Individual members in good standing with the Association may vote and hold office. All members will receive a copy of minutes and other notices and publications from the Association.

ARTICLE IV. DUES

1. The annual dues shall be determined by the Executive Committee with the advice of the Treasurer, subject to approval by the members at the annual business meeting, and take effect in the year following their adoption.

2. Dues are to be received at or before the Annual Meeting of the Association for the following twelve months.

3. Dues for the 12 month period beginning July, 1996 will be $20.00 for an Individual membership and $10.00 for a Student membership.

ARTICLE V. MEETINGS

1. A summer meeting will be held annually for the presentation of papers, committee meetings, field activities and/or discussion. The annual business meeting shall be held with attention given to the election of new officers, financial matters (if any changes are recommended by the Executive Committee), changes in the By-Laws, and other matters as the Executive Committee or members may designate.

2. The Association shall provide current members with a written notice of the Annual Meeting, in the Spring newsletter or by a special mailing at least two months in advance of the Annual Meeting.

3. A simple majority of members in attendance at a meeting shall constitute a quorum for the formal transaction of business. A special Business Meeting may be called by the Executive Committee with 30 days written advance notice to the members.
{NOTE. Must comply with incorporation rules if we incorporate.}

4. For meetings of the Executive Committee or committees established by the Association, a simple majority of the members duly assigned to such board or committee shall constitute a quorum for the transaction of business.

5. Registration fees for the Annual Meeting will be set by the host institution to cover reasonable and necessary expenses of the program and related activities.

ARTICLE VI. OFFICERS

1. The officers of the Association shall be the president, president-elect, immediate past president, secretary, treasurer, and Two Members-at-Large. The officers shall serve without monetary compensation.

2. The officers and directors shall be elected by the members in attendance at the Annual Meeting from nominations by the Nominating Committee appointed by the Executive Board or from nominations from the floor in accordance with ARTICLE V., 2.

3. The President shall arrange and preside at all meetings of the Association and the Executive Committee and with the advice of the Executive Committee shall carry on, transact, and supervise the interim affairs of the Association and provide leadership in the promotion of the objectives of this Association. The president is responsible for seeing that an Annual Meeting is held, consistent with the Association objectives. The term of the president is one year.

4. The President-elect shall be responsible for the development and coordination of the next Annual Meeting following his election. The individual will work with the Planning Committee to assure all geographic and varied disciplinary area participation in the program for the Association. President-elect serves for one year and automatically assumes the Presidency for the following year.

5. The Secretary shall record and maintain minutes of Annual Meetings, deliberations of the Executive Committee, reports of each committee as submitted at the Annual Meeting, and safely and systematically keep a record of all documents belonging to the Association. The Secretary shall assure that the membership is informed of the Association activities. The Secretary will serve a two year term, except for the initial election which will be for a one year term, to insure continuity of records. The Secretary will be elected in odd number years.

6. The Treasurer shall keep account of all monies, credits, debts, and property of the Association, and shall render accounts, statements and reports as shall be required by the Association or others. The Treasurer is responsible for collecting membership dues, registration fees and other income and dispersing monies to cover expenses of the Association. The Treasurer's records and activities are subject to annual audit by the Audit Committee. The Treasurer will serve a two year term to insure continuity. The Treasurer will be elected in even number years.
{NOTE: Must comply with incorporation rules if we incorporate.}

7. In the event the president or president-elect, or both should resign or become unavailable to serve their full terms of office, the Executive Committee shall appoint a president, or vice president, to complete the unexpired terms until the next Annual Meeting when one or both officers will be filled by normal elective procedure. The most recent available past president shall serve as president until the Executive Committee can make such appointment.

8. Two Members-at-Large positions will be elected. One position will represent a Northern the other a Southern region of the Plains and Prairie Forestry Association. The boundary of the regions will be 41° North Latitude, however states and provinces will remain whole units and belong to the region in which most of their land area falls. The Northern Member-at-Large will be elected in odd number years and the Southern Member-at-Large in even number years.

ARTICLE VII. EXECUTIVE COMMITTEE

1. The Executive Committee shall consist of the following:

   a. President
   b. Immediate Past President
   c. The President-elect
   d. Secretary
   e. Treasurer
   f. Two members elected at large

2. Vacancies of Executive Committee positions may be filled by vote of the remaining members of the Committee until the next annual meeting.

3. The Executive Committee shall make reports and recommendations to the Association on activities of the Executive Committee. Contingencies not provided for elsewhere in these By-Laws shall be handled by the Executive Committee in a manner they deem in the best interest of the Association.

4. The Executive Committee may act for the Association between meetings of the Association on any matters necessary.

ARTICLE VIII. COMMITTEES

1. Committees of the Association may include: Annual Planning, Tree Improvement, Windbreak, Audit, Nomination, Newsletter, and other committees as may be established by the President, Board or the Association.

2. Membership on committees is at the individual members discretion, except the Audit Committee which will be appointed by the President. The Newsletter Editor appointed by the President will chair the Newsletter Committee and be responsible for publication and distribution of at least three newsletters per year. Other committees will elect a chair from their group at each Annual Meeting.

ARTICLE IX. AMENDMENTS

1. These By-Laws may be amended consistent with the provision of the Articles of Incorporation by a voting quorum, provided such amendments shall be submitted in writing to each member by the Executive Committee at least 30 days before the meeting at which the action is to be taken. Changes will then be voted on by the members present at the Annual Meeting.

2. A By-Law or amendment to a By-Law shall take effect immediately upon its adoption, except that the Executive Committee may establish a transitional schedule when the change is best effected over a period of time. The amendment and transition schedule, if any, shall be published in the next Association Newsletter following its adoption.

NOTE: (Dissolving the P&PFA? How and what happens to any funds?

Adopted by the Annual Meeting of the
Great Plains Forestry Association
Meeting at _____, _____
(location) *(date)*