New Developments in Wood-Destroying Organisms from the International Research Group on Wood Preservation (IRG)[1]

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Abstract: New developments in wood-destroying organisms and in wood protection from the 20th annual meeting (May 1989 at Lappeenranta, Finland) of the International Research Group on Wood Preservation (IRG) are highlighted in the areas of biological control of fungi, dry rot, decay mechanisms and product problems, new techniques, insect problems and control, and developments in wood preservatives.

The aim of the International Research Group on Wood Preservation (IRG) is "to promote research throughout the world on the subject of wood preservation" (Anonymous 1988). With members in 55 nations around the world, its annual meetings and the documents presented provide a stimulating forum for exchange and discussion of new ideas in research and problem-solving in the areas of wood-destroying organisms and methods of wood protection.

The IRG Secretariat is currently housed in Sweden (Drottning Kristinas vag 47C, S-114 28, Stockholm). The presentations at the annual meeting were organized into four main Working Groups with a number of Subgroups in each:

Working Groups IA & IB--Flora and Fauna

Microbial breakdown mechanisms
The problem of pretreatment decay
The problem of dry rot
ermite behavior associated with new methods of termite control
Insects in dry wood (excluding termites)

Working Group II--Fundamentals of Testing

Soft rot tests
Field tests out of ground contact Accelerated aging tests
Non-destructive testing for defects in wood structures

Working Group III--Preservatives and Methods of Treatment

Collaborative field experiment
Health and safety aspects
Remedial treatments
Refractory timbers

Working Group IV--Marine Wood Preservation

Leaching of some copper-based preservatives
The use of wood in boats
Sheathing materials

Given the great number of research documents (>125) discussed at the meeting, it was necessary to only skim the bulk of information for topics of interest to those attending the joint Western International Forest Disease Work Conference and Western Forest Insect Work Conference meeting. For more details and data on, the topics briefly discussed, please contact the IRG Secretariat for copies of specific documents.

BIOLOGICAL CONTROL DEVELOPMENTS

Control of blue stain on Araucaria cunninghamii Aiton in Australia with the bacterium Pseudomonas cepacia (ex Burkholder) Palleroni and Holmes was excellent in the laboratory, but only 50-65 percent effective in 2-month field trials (Benko 1989). Wood from a Scots pine pole treated 7 years earlier with Trichoderma spp. still resisted decay by Lentinus lepideus Fries in soil-block tests (Bruce and others 1989).

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NEW INFORMATION ON THE DRY ROT FUNGUS Serpula lacrymans (Wulfen ex Fries) Schroeter

Dry rot fungus is a major destroyer of buildings in Europe and in certain areas of Japan and Australia. Mortar or some source of calcium seems necessary for growth to neutralize the copious oxalic acid produced by this fungus by the formation of calcium oxalate (Bech-Andersen 1989, Trong 1989). A heat treatment has been developed to eradicate the fungus from structures (40ºC for 24 h), and fungus cell viability can be checked by Janus Green B stain (a method more sensitive than culture attempts) (Koch and others 1989). This fungus can remove nitrogen from the soil to enhance growth in wood (Doi and Togashi 1989). Temperature apparently restricts its distribution in Australia and its growth rate is not related to decay capacity (Thornton 1989a, b).

MISCELLANEOUS POINTS ON WOOD DECAY

Peniophora gigantea (Fries) Massee was found to be the most common decay fungus in Scots pine logs during air seasoning in the United Kingdom, and may well be so because of its use as a biological control agent against Heterobasidion annosum (Fries) Brefeld in the region of tree harvest (Zahora and Dickinson 1989). Soft rot (not detectable by hammer sounding) appears not to be a problem in CCA-treated pine poles in Sweden where earlier treatments lacking copper failed in service (Friis-Hansen and Ludstrom 1989). Interesting work on the role of extracellular matrix in decay was presented by workers from the USDA Forest Products Laboratory in Madison, Wisconsin (Green and others 1989; Micales and others 1989), and work from Sweden has shown localization of lignin degrading enzymes in wood (Daniel and others 1989). Work from South Africa has demonstrated that strictly anerobic fungi (from ruminates) can colonize and may degrade wood (Wiederhold and others 1989). New methods for detection of organisms include use of fluorescein diacetate (FDA) hydrolysis to measure mold growth on wood indirectly (Bjurman 1989), and ion mobility spectrometry (IMS) to detect bacterially infested red oak in the field (Lawrence and others 1989).

INSECTS

A review of toxicants used around the world to control termites was presented (French and LaFage 1989), and an excellent review on nonchemical termite barriers noted promise for small particle applications (French 1989). Chlordane residues in soil around homes in Louisiana reflect the fact that 14 percent of the treatment sites may be potentially susceptible to the Formosan termite (LaFage and Delaplane 1989). Early promise was demonstrated in the use of acoustic emissions to detect termites feeding in wood (Fujii and others 1989). Problems with weevils (Curculionidae) and death watch beetles (Anobiidae) in historical/heritage buildings were noted in Spain and Finland (Trobajo 1989, Viitanen and Pulkkinen 1989).

WOOD PRESERVATIVE DEVELOPMENTS

New generation organic formulations for mold and stain control were compared in a study from the United Kingdom (Williams and Lewis 1989). Acetylated wood has now found commercial application in Japan (Takahashi and others 1989). Proprionic acid is used to protect wood chips for export from South Africa (Ismail and others 1989). Other problems discussed included mention of the surface hardness resulting from CCA treatment of pine poles (Jonnsson and others 1989), increasing interest in the use of borates for decay protection and remedial treatment (Barnes and others 1989; Henningsson and others 1989), surface enhancement of wood with metal tannates (Plackett and Cronshaw 1989), and performance of pressure-treated spruce in field trials (Hosli and Doyle 1989).

Again, many other topics of interest were presented at the IRG meeting in Finland in 1989, but were not discussed at this meeting due to time constraints of the presentation. Interested persons should examine the Annual Proceedings of the American Wood Preservers' Association (AWPA) which lists titles of IRG papers, or contact the IRG Secretariat.

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REFERENCES

All references cited are published by the International Research Group on Wood Preservation, Drotting Kristinas vag 47C, S-114 28, Stockholm, Sweden.

Anonymous. 1988. IRG Statutes, Members, and Sponsors. Stockholm, Sweden: IRG Secretariat; 115 p.

Barnes, H. M.; Amburgey, T. L.; Williams, L. H.; Morrell, J. J. 1989. Borates as wood preserving compounds: the status of research in the United States. IRG/WP/3542.

Bech-Andersen, J. 1989. Serpula lacrymans the

dry rot fungus: Revue on previous papers. IRG/WP/1393.
Benko, R. 1989. Biological control of blue stain on wood with Pseudomonas cepacia 6253: laboratory and field test. IRG/WP/1380.
Bjurman, J. 1989. Effect of humidity fluctuations on mould growth on pine wood. IRG/WP/1412.
Bruce, A.; King, B.; Highley, T. L. 1989. Decay resistance of wood removed from poles treated with Trichoderma. IRG/WP/1386.
Daniel, G.; Pettersson, B.; Nilsson, T.; Volc, J. 1989. Cytoplasmic and extracellular localization of manganese II dependent peroxidase(s) in white rot fungi during degradation of woody materials. IRG/WP/1416.
Doi, S.; Togashi, I. 1989. Utilization of nitrogenous substance by Serpula lacrymans. IRG/WP/1397.
French, J.R.J. 1989. The case for non-chemical termite barriers in termite control? IRG/WP/1381.
French, J.R.J.; LaFage, J. P. 1989. Termite standards questionnaire survey - Second report. IRG/WP/1395.
Friis-Hansen, H.; Ludstrom, H. 1989. Soft rot in CCA-treated utility poles in Sweden. IRG/WP/1398.
Fujii, Y.; Noguchi, M.; Imamura, Y.; Tokoro, M. 1989. Detection of termite attack in wood using acoustic emissions. IRG/WP/2331.
Green, F.; Larsen, M. J.; Murmanis, L. L.; Highley, T. L. 1989. Proposed model for the penetration and decay of wood by the hyphal sheath of the brown-rot fungus Postia placenta. IRG/WP/1391.
Henningsson, B.; Friis-Hansen, H.; Kaarik, A.; Edlund, M. L. 1989. Remedial ground-line treatment of CCA poles in service: a final report after 60 months' testing. IRG/WP/3534.
Hosli, J. P.; Doyle, E. E. 1989. Performance of treated spruce in Canadian field test sites. IRG/WP/3506.
Ismail, S.; Smith, E. J.; Baecker, A.A.W. 1989. The use of propionic acid to prevent Pinus patula biodeterioration during outside chip storage in Zululand. IRG/WP/3531.
Jonnsson, E.; Anette-Nilsson, E. M.; Ruddick, J.N.R. 1989. The effect of service life and preservative treatment on the hardness of wooden poles. IRG/WP/3537.
Koch, A. P.; Kjerulf-Jensen, C.; Madsen, B. 1989. New experiences with dry rot in Danish buildings, heat-treatment and viability tests. IRG/WP/1423.
LaFage, J. P.; Delaplane, K. S. 1989. Variable chlordane residues in soil surrounding houses in Louisiana. IRG/WP/1404.
Lawrence, A. H.; Ward, J.; Pettersen, J. C. 1989. Identification of bacteria-infected red oak by ion mobility spectrometry. (Abstract of Poster in IRG/WP/5342; p.22.).
Micales, J. A.; Richter, A. L.; Highley, T. L. 1989. Extracellular carbohydrate production by isolates of Postia (= Poria) placenta. 1989. IRG/WP/1388.
Plackett, D. V.; Cronshaw, D. R. 1989. Wood surface pretreatments with metal tannates. IRG/WP/3552.
Takahashi, M.; Imamura, Y.; Tanahashi, M. 1989. Effect of acetylation on decay resistance of wood against brown rot, white rot, and soft rot fungi. IRG/WP/3540.
Thornton, J. D. 1989a. The restricted distribution of Serpula lacrymans in Australian buildings. IRG/WP/1382.
Thornton, J. D. 1989b. A new laboratory technique devised with the intention of determining whether, related to practical conditions, there should be a relationship between growth rate and decay capacity (of different strains) of Serpula lacrymans. IRG/WP/1384.
Trobajo, E.L.R. 1989. Description of the damage produced by xilophagus curculionides in Spain. IRG/WP/1408.
Trong, L. 1989. An attempt to grow dry rot fungus Serpula lacrymans on mortar substrate in non-sterile conditions. IRG/WP/1385.
Viitanen, H.; Pulkkinen, M. 1989. The wood attacking insects in wooden houses of an old open air museum in southern Finland. IRG/WP/1409.
Wiederhold, A. H.; Morrison, M.; Baecker, A.A.W. 1989. The colonization pattern of anaerobic fungi in wood. IRG/WP/1403.
Williams, G. R.; Lewis, D. A. 1989. Observations on the colonization of freshly-felled timber treated with prophylactic chemicals by mould and sapstain fungi. IRG/WP/1394.
Zahora, A. R.; Dickinson, D. J. 1989. Pretreatment decay in air-seasoning Scots and Corsican pine poles in England. 1989. IRG/WP/1390.