Cooperative Linkages for *Populus* Research & Applications in North America:

A Comprehensive Database from 1989 to 2009

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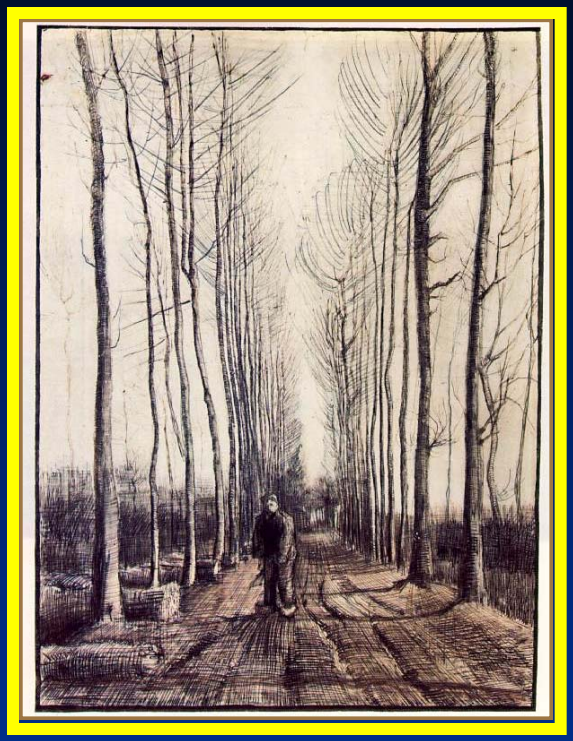
The Genus *Populus*

Historically …

- Most studied tree genus in the world
- Proponents
  - Poplar cured Hercules of serpent bite
  - Native Americans used for medicine (*P. balsamifera*)
  - Van Gogh & Monet depicted them
- Opponents
  - Jesus was hung on a *P. tremula*
  - Judas Iscariot allegedly hanged himself on a *P. tremula*
  - 19th century lumberjacks in Great Lakes (USA) would not sleep in cabins made from aspen



Lane with Poplar Trees, 1884
- Vincent Van Gogh

Populus in North America

March 1, 1939

TESTS ON OXFORD HYBRID POPLARS

By W. A. Kluender, Assistant to Technician, Lake States Forest Experiment Station[1/]

GENERAL

Since 1924 the Oxford Paper Company of Frye, Maine, has developed over 13,000 new poplar hybrids. Recently, the Northeastern Forest Experiment Station took over these studies and has arranged to test the more promising hybrids in several typical sections of the country. One such test was established in 1938 at the Chittenden Nursery in lower Michigan in cooperation with the Lake States Forest Experiment Station and Region 9. For this purpose the region made available its nursery facilities and the experiment station supervised the planting of the cuttings and maintained necessary records of survival, growth, and development.

1/ The work was conducted under the supervision of Paul O. Rudolf, Associate Silviculturist, Lake States Forest Experiment Station. Acknowledgment is made of the splendid cooperation received from the Chittenden Nursery personnel.

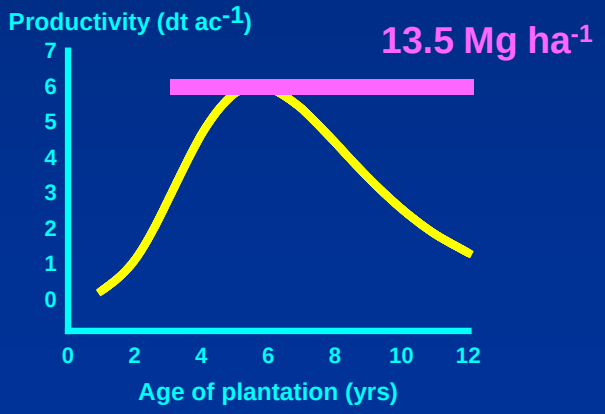
1920's

September 15, 2006

2000's

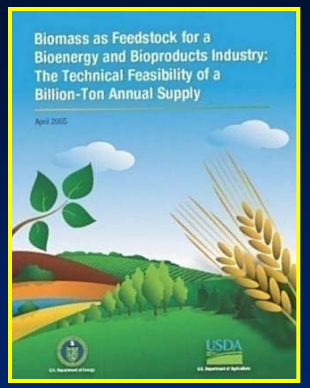
Why Poplars?

- Broad economic & environmental benefits
- Well-studied (silviculture, physiology, & genetics)
- Base populations exhibit tremendous diversity
- Grown on marginal lands not suitable for agriculture
- Very productive

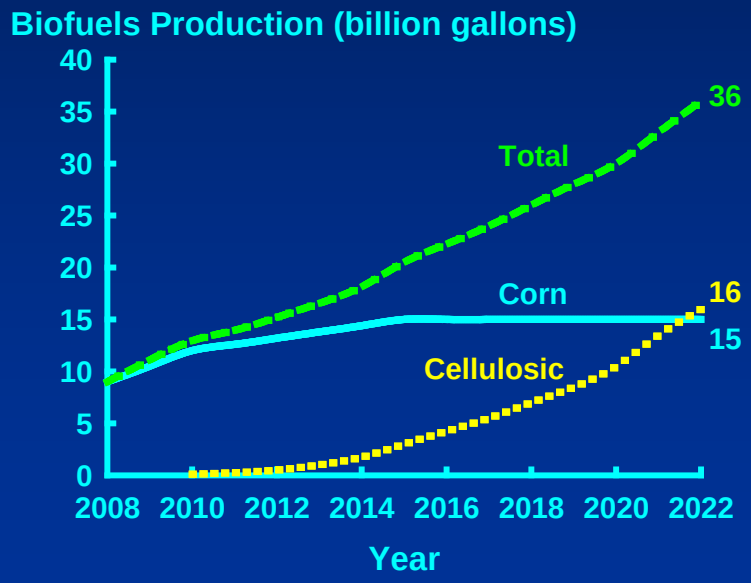


Renewable Fuel Standard

Energy Independence & Security Act of 2007



- Annual production of 36 billion gallons of biofuels by 2022
- Ethanol production from corn capped at 15 billion gal yr^{-1}
- Remaining 21 billion gallons from advanced biofuels
- 16 billion gallons from cellulosic biofuels
- Seven-fold increase in current biomass production from 190 million dry tons to 1.36 billion dry tons
- DOE / USDA goal of replacing 30% petroleum consumption with biofuels by 2030



Perlack, R.D. 2005. Biomass as feedstock for a bioenergy and bioproducts industry: the technical feasibility of a billion-ton annual supply. DOE-USDA. DOE/GO-102995-2135. ORNL/TM-2005/66

Source: Renewable Fuels Association. http://www.ethanolrfa.org/resource/standard

Previous *Populus* Bibliographies

Populus: A Bibliography of World Literature

- **1975 to 1988**

  Ostry, ME, Henderson, FL. 1990.
  USDA Bibliographies & Literature of Agriculture 104. 721 p.

- **1964 to 1974**

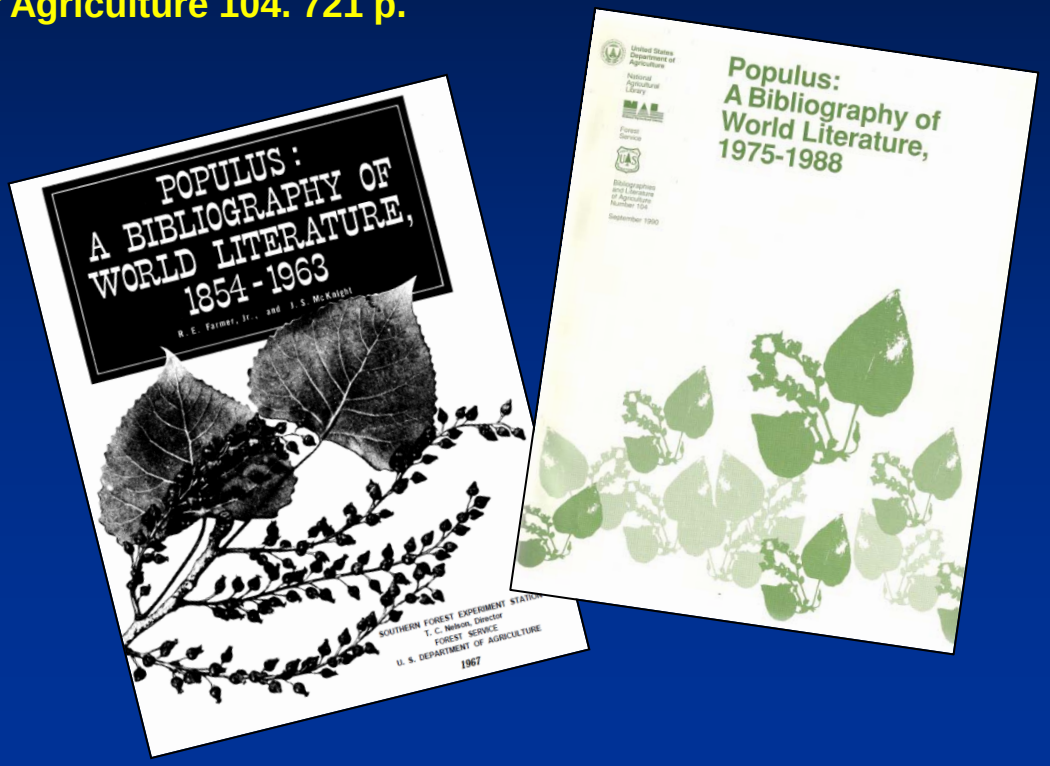
  Hart, ED. 1976.
  USDA FS SO-RP-124. 227 p.

- **1854 to 1963**

  Farmer, RE Jr., McKnight, JS. 1967.
  USDA FS SO-RP-27. 132 p.

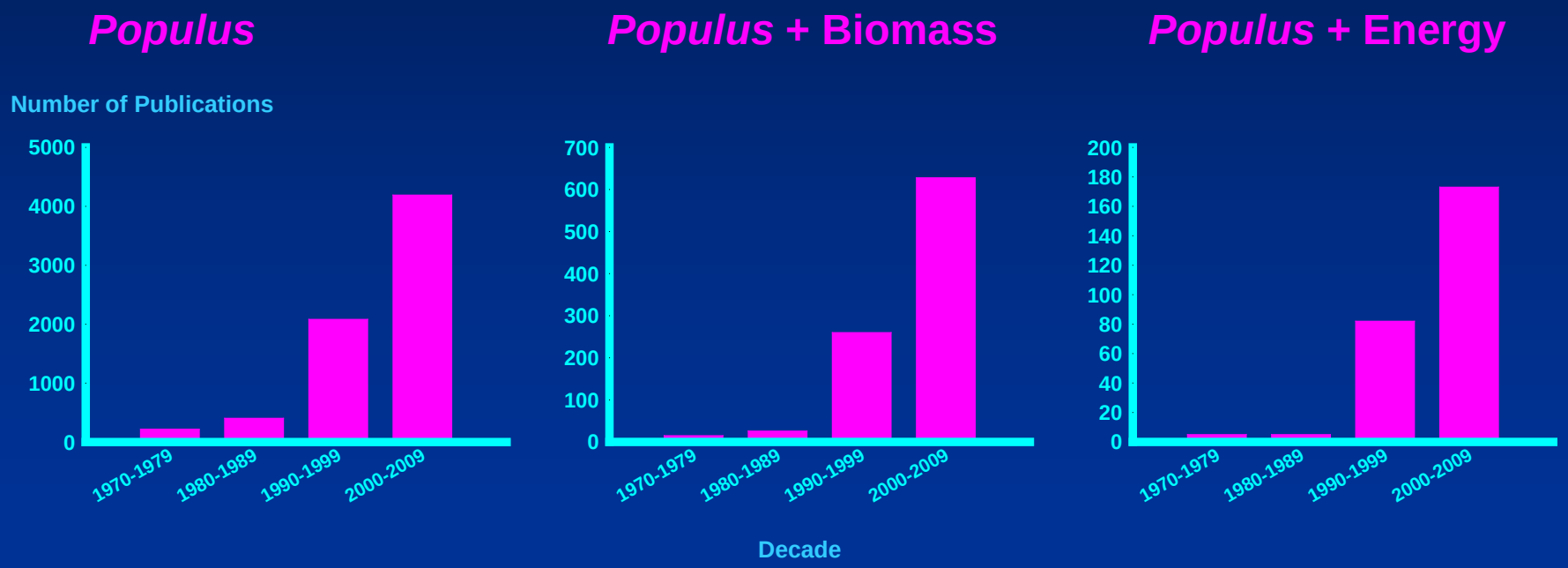
- **Others**

  Fege, AS, Brown, GN. 1984.
  Research evaluation: case study of short rotation forestry research, 1966 to 1982.



Need for Something New

- Previous databases are outdated
- Number of forestry & bioenergy journals has increased
- Number of peer-reviewed publications has increased

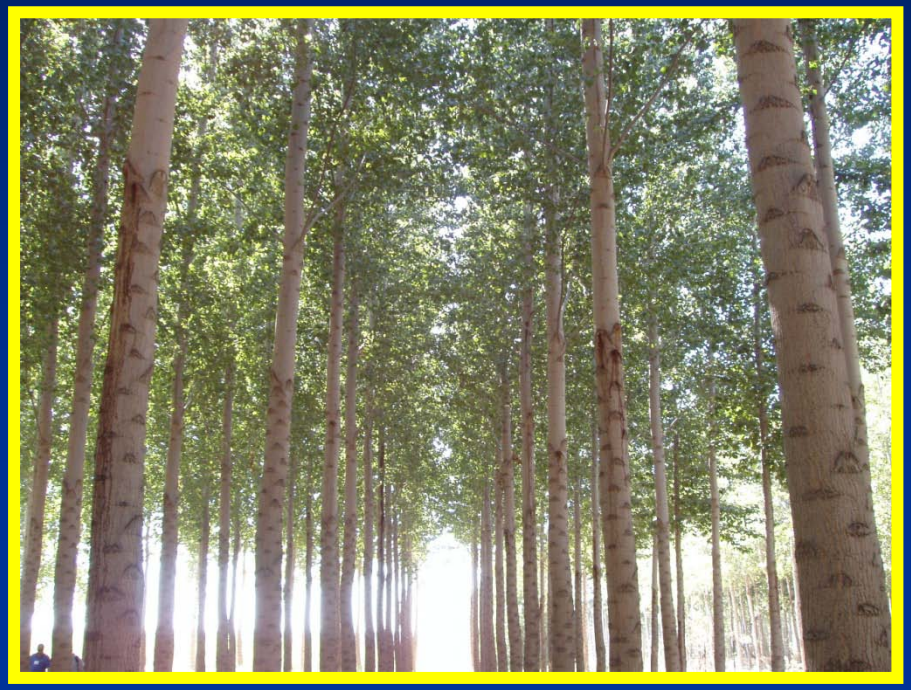


Source: ISI Web of Knowledge; Accessed September 7, 2010

Poplar Research Database

Objectives

- Compile peer-reviewed literature in one interactive location
- Encourage publication in peer-reviewed journals
- Enhance collaborations with partners outside of *Populus* community



Poplar Research Database

Constraints

- Only peer-reviewed manuscripts
- Published between 1989 & 2009
- Focused on poplars, cottonwoods, aspens, & their hybrids

grown as short rotation woody crops

- Focused on research conducted in North America
- Focused on at least one topic area

12 Topic Areas

- Conservation
- Diseases
- Economics & Social Science
- Genetics
- General
- Cell & Tissue Culture
- Growth & Productivity
- Insects & Mites
- Physiology
- Phytotechnologies
- Silviculture
- Harvesting & Wood Products

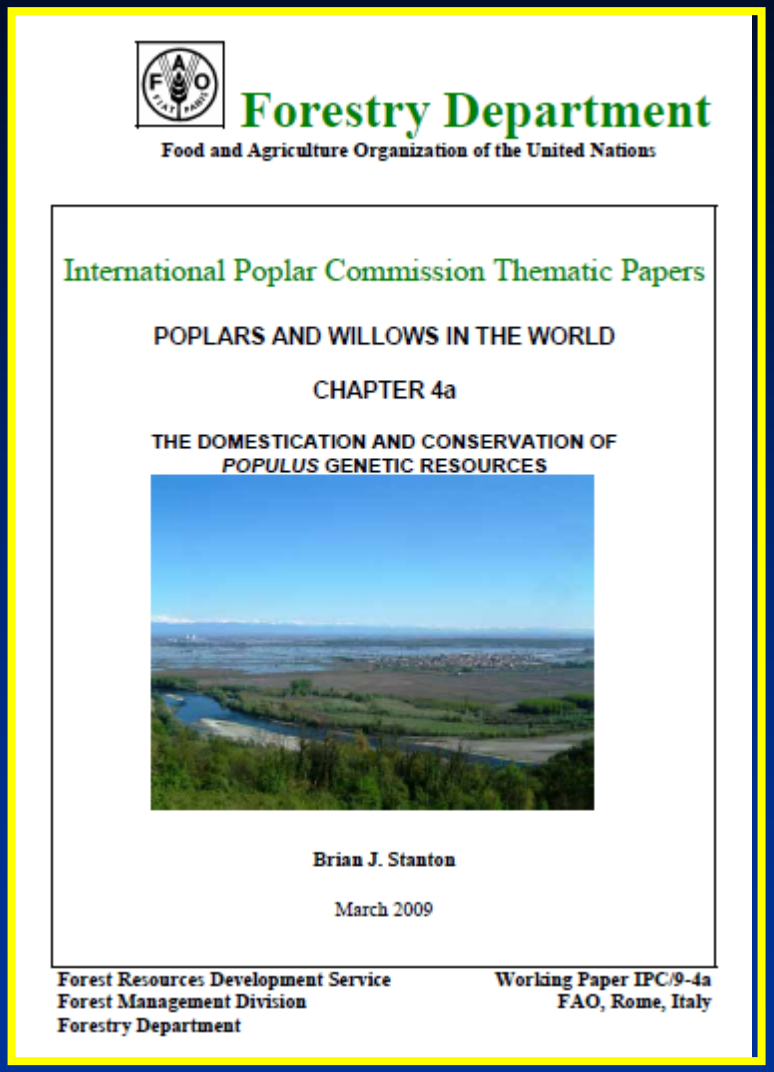
How Do Manuscripts Get Included?

Database Team

- Book chapters
- Old hardcopy files
- Literature searches

Collaborators

- Individual submissions
- Gmail submissions



Forestry Department

Food and Agriculture Organization of the United Nations

International Poplar Commission Thematic Papers

POPLARS AND WILLOWS IN THE WORLD

CHAPTER 4a

THE DOMESTICATION AND CONSERVATION OF *POPULUS* GENETIC RESOURCES

Brian J. Stanton

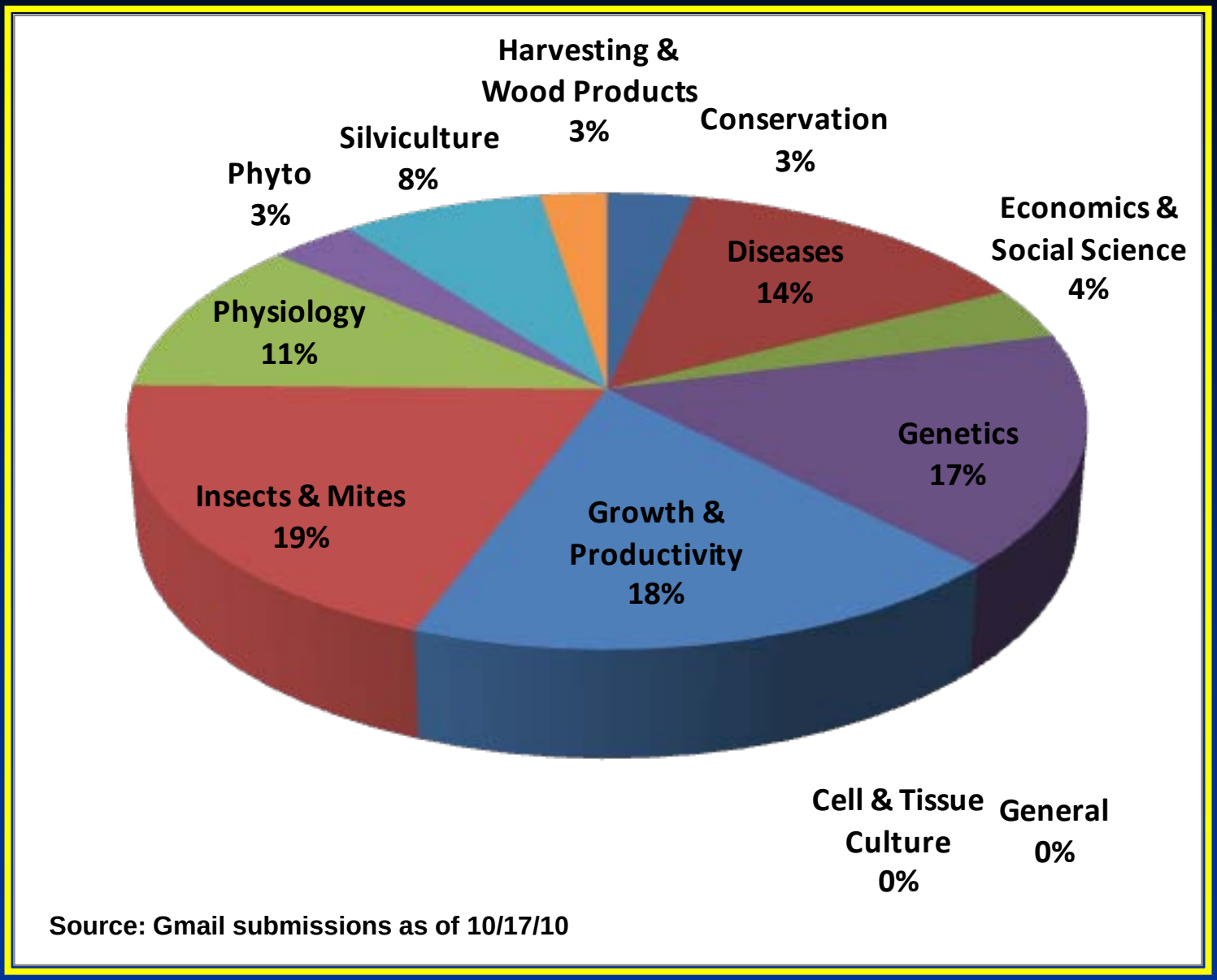
March 2009

Forest Resources Development Service
Forest Management Division
Forestry Department

Working Paper IPC/9-4a
FAO, Rome, Italy

populusdatabase@gmail.com

Distribution of Submissions



Source: Gmail submissions as of 10/17/10

Poplar Research Database

Manuscript Placement

Forest Ecology and Management 255 (2008) 3365–3373

Contents lists available at ScienceDirect

Forest Ecology and Management

journal homepage: www.elsevier.com/locate/foreco

Full length article

Effects of repeated cottonwood leaf beetle defoliation on *Populus* growth and economic value over an 8-year harvest rotation

David R. Coyle [a,1,*], Elwood R. Hart [a,b], Joel D. McMillin [a,c], Lita C. Rule [a], Richard B. Hall [a]

[a] *Iowa State University Department of Natural Resource Ecology and Management, Ames, IA 50011, USA*
[b] *Emeritus, Iowa State University Departments of Entomology and Forestry, Ames, IA, USA*
[c] *USDA Forest Service, Forest Health Protection, Flagstaff, AZ, USA*

Insects & Mites

Silviculture

Growth & Productivity

Poplar Research Database

Manuscript Placement

Available online at www.sciencedirect.com
ScienceDirect
Environmental Pollution 155 (2008) 72–80
ELSEVIER
ENVIRONMENTAL POLLUTION
www.elsevier.com/locate/envpol

Sodium and chloride accumulation in leaf, woody, and root tissue of *Populus* after irrigation with landfill leachate

Jill A. Zalesny [a,b,*], Ronald S. Zalesny Jr. [b], Adam H. Wiese [b], Bart Sexton [c], Richard B. Hall [a]

[a] *Iowa State University, Department of Natural Resource Ecology and Management, 339 Science II, Ames, IA 50011, USA*
[b] *US Forest Service, Northern Research Station, Institute for Applied Ecosystem Studies, 5985 Highway K, Rhinelander, WI 54501, USA*
[c] *Oneida County Solid Waste Department, 7450 Highway K, Rhinelander, WI, 54501, USA*

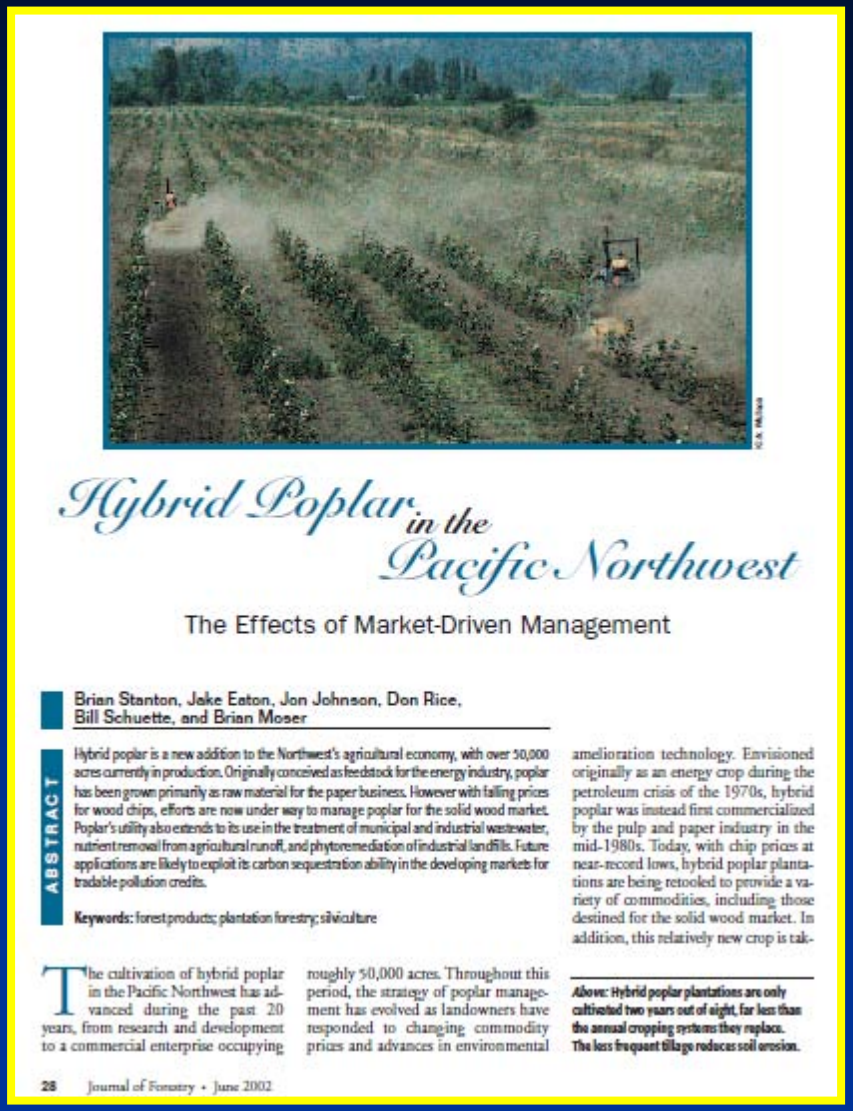
Received 24 May 2007; received in revised form 3 September 2007; accepted 28 October 2007

Sodium and chloride supplied via landfill leachate irrigation is accumulated at high concentrations in tissues of Populus.

Phytotechnologies

Physiology

Manuscript Placement



Hybrid Poplar in the Pacific Northwest

The Effects of Market-Driven Management

Brian Stanton, Jake Eaton, Jon Johnson, Don Rice, Bill Schuette, and Brian Moser

ABSTRACT

Hybrid poplar is a new addition to the Northwest's agricultural economy, with over 50,000 acres currently in production. Originally conceived as feedstock for the energy industry, poplar has been grown primarily as raw material for the paper business. However with falling prices for wood chips, efforts are now under way to manage poplar for the solid wood market. Poplar's utility also extends to its use in the treatment of municipal and industrial wastewater, nutrient removal from agricultural runoff, and phytoremediation of industrial landfills. Future applications are likely to exploit its carbon sequestration ability in the developing markets for tradable pollution credits.

Keywords: forest products; plantation forestry; silviculture

The cultivation of hybrid poplar in the Pacific Northwest has advanced during the past 20 years, from research and development to a commercial enterprise occupying roughly 50,000 acres. Throughout this period, the strategy of poplar management has evolved as landowners have responded to changing commodity prices and advances in environmental amelioration technology. Envisioned originally as an energy crop during the petroleum crisis of the 1970s, hybrid poplar was instead first commercialized by the pulp and paper industry in the mid-1980s. Today, with chip prices at near-record lows, hybrid poplar plantations are being retooled to provide a variety of commodities, including those destined for the solid wood market. In addition, this relatively new crop is tak-

Above: Hybrid poplar plantations are only cultivated two years out of eight, far less than the annual cropping systems they replace. The less frequent tillage reduces soil erosion.

- Conservation
- Diseases
- Economics & Social Science
- Genetics
- General
- Cell & Tissue Culture
- Growth & Productivity
- Insects & Mites
- Physiology
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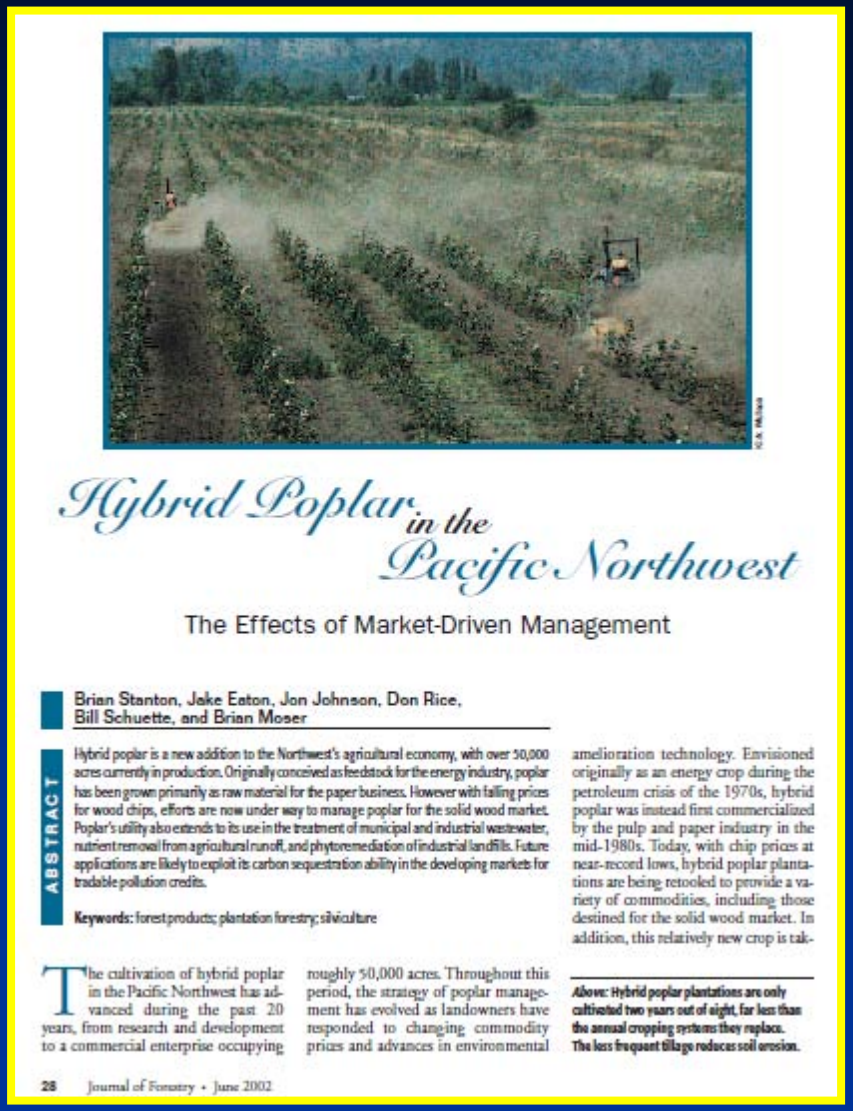
- Silviculture
- Harvesting & Wood Products

Manuscript Placement



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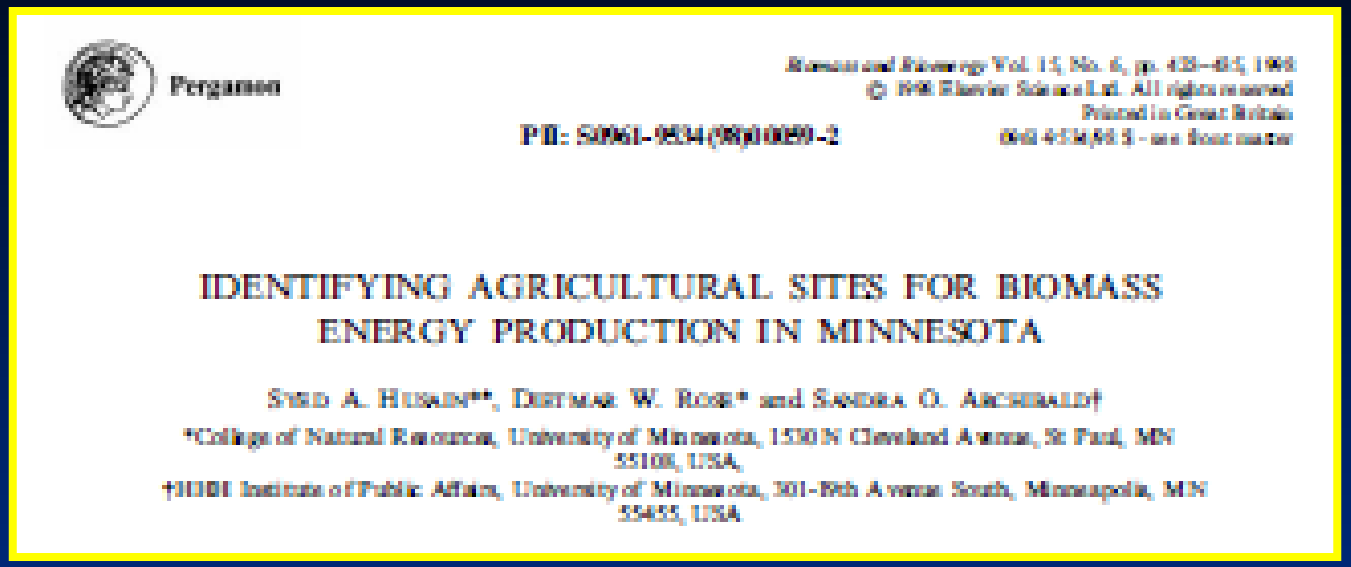

Pergamon

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IDENTIFYING AGRICULTURAL SITES FOR BIOMASS ENERGY PRODUCTION IN MINNESOTA

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*College of Natural Resources, University of Minnesota, 1530 N Cleveland Avenue, St Paul, MN 55108, USA,

†HHH Institute of Public Affairs, University of Minnesota, 301-19th Avenue South, Minneapolis, MN 55455, USA

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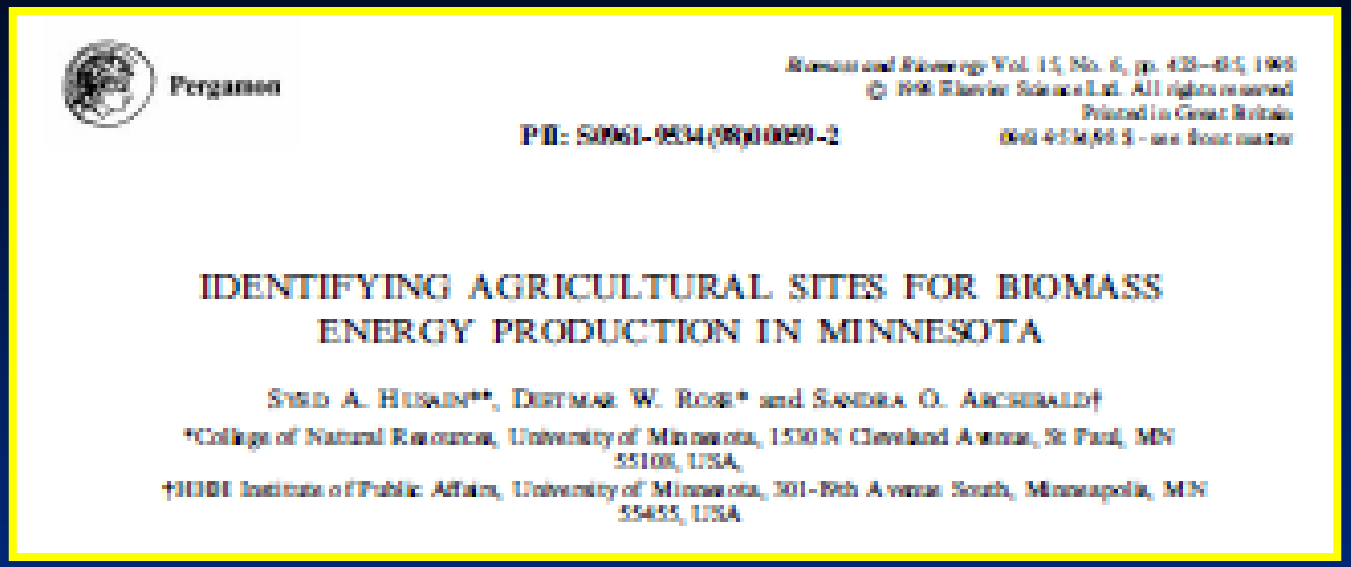

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- Silviculture
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Future Directions

- Target completion date: 2011?
- Released online & via CD distribution (pending copyright issues)
- Accelerated outreach efforts

populusdatabase@gmail.com

- Suggestions
- Collaborations

ACKNOWLEDGMENTS

This research is funded by U.S. Forest Service Northern Research Station – Research Work Unit RWU-NRS-13 and a grant from Wisconsin Focus on Energy Environmental and Economic Research and Development Program.