Poplars and Willows:
Trees for Society and the Environment

J.G. Isebrands & J. Richardson

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Working Party 6, Environmental Applications
Gisborne, New Zealand, March 10, 2014

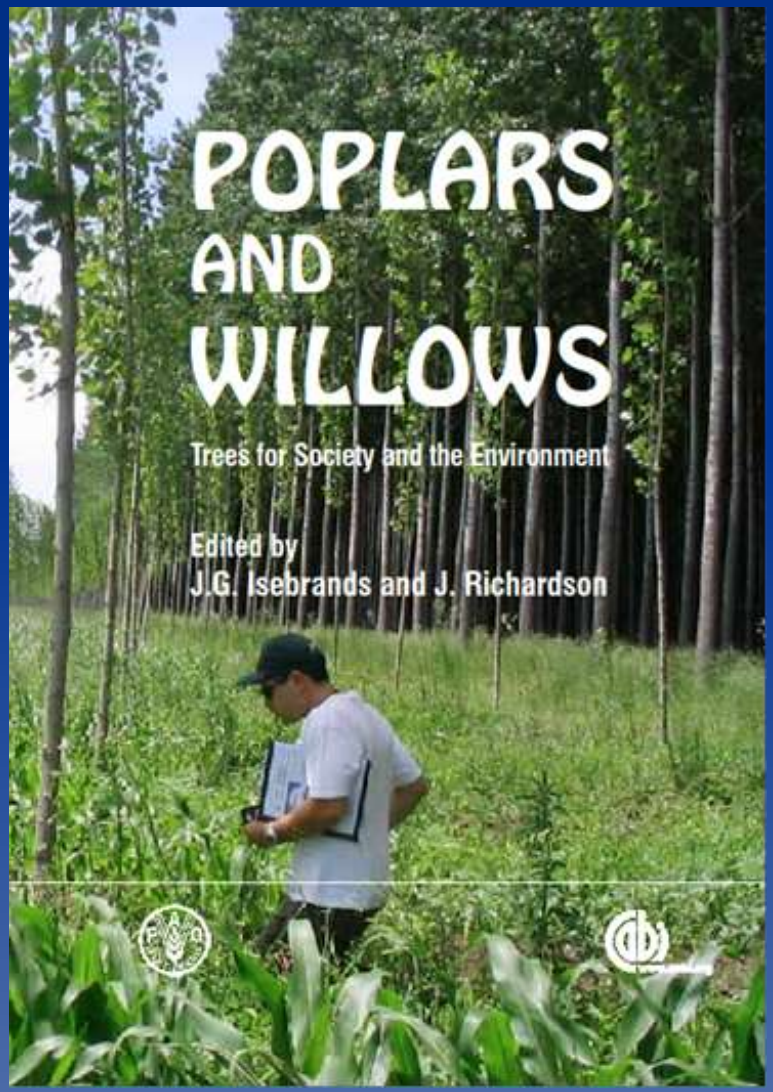
Background

- *Poplars in forestry and land use* - FAO 1958
- *Poplars and willows in wood production and land use* - FAO 1980
- Both now out of date & out of print
- IPC Exec. Comm. 2002 - proposed new edition of FAO/IPC poplar book
- A new global publication resource for a new age

Objective

- To produce a major update of the previous (1980) edition of the FAO publication on poplars and willows in an accessible format, providing a practical worldwide overview and guide to their basic characteristics, cultivation and use as well as issues, problems and trends relating to poplars and willows.

Mission accomplished!



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Audience

- Public and private sectors
- Decision makers & policy makers in forestry, agriculture & environment ministries
- Foresters, ecologists, botanists, agronomists, environmental engineers
- Developing and developed world

Scope

- World-wide
- More emphasis on willows
- New focus on environmental uses and sustainable rural development
- Sourcebook and information guide
  - comprehensive reference list with each chapter
    - more than 2600 references
  - taxonomic classification of *Populus* and *Salix*
  - index
  - glossary

Contents

Format

- Hard-cover book
  - 660 pages
- Co-publication of FAO and CABI
- Fully illustrated
  - 48 colour plates, including 41 species range maps & 178 photos
  - 379 black and white illustrations
- English language

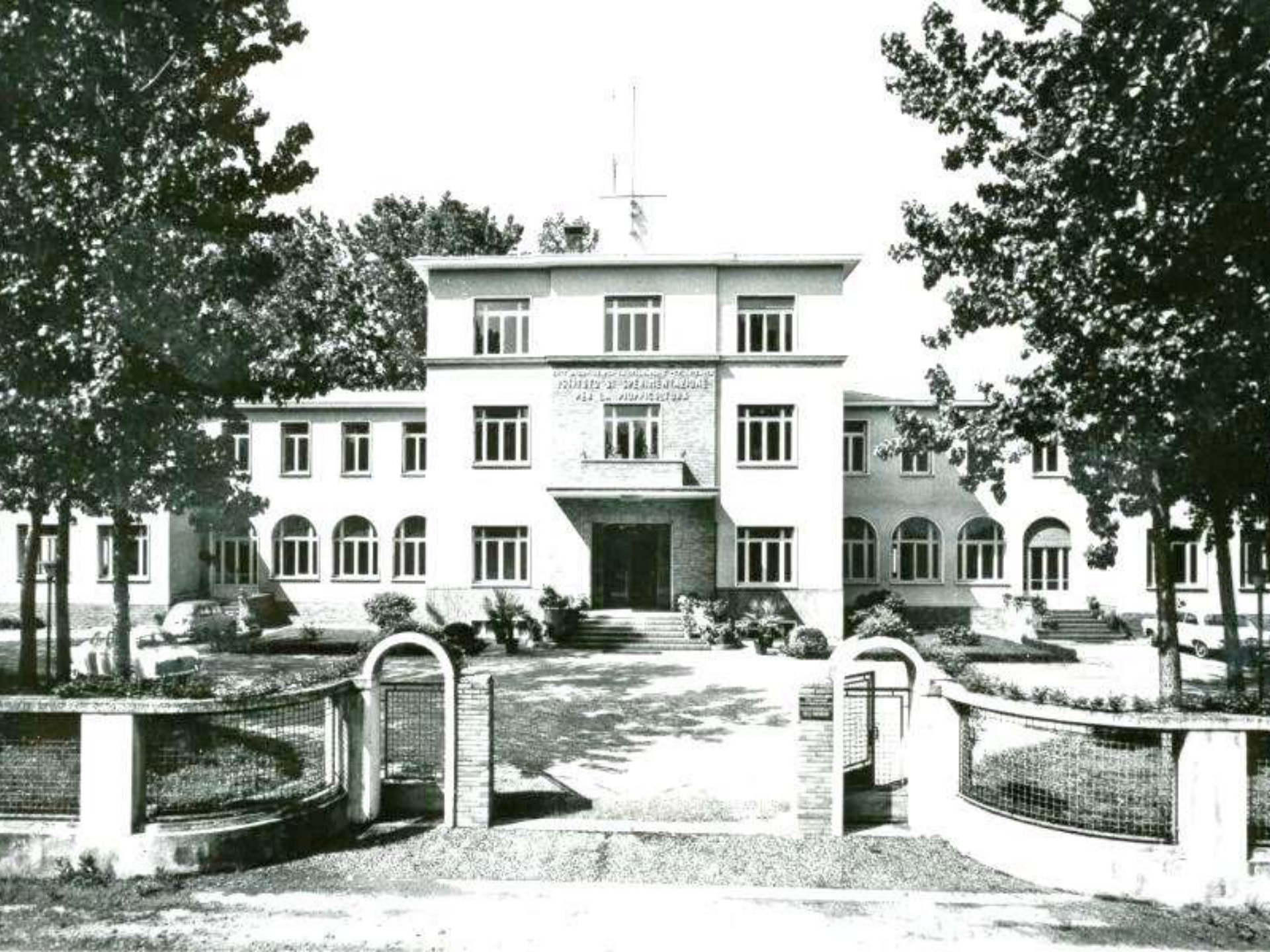
Process

- Overall project supervision - FAO
- Editing/coordination - Jud Isebrands, Jim Richardson
- Chapters written by teams of authors with chapter leads
  - 67 authors from 15 countries in 5 continents
  - >150 contributors
- Peer review of individual chapters
- Production by CABI

Chapter 1

- **‘Introduction’**
- *J.G. Isebrands and J. Richardson*

- Background, history
- Scope and content of publication



Chapter 2

- **‘Poplars and Willows of the World, with emphasis on silviculturally important species’**
- *Don Dickmann* (poplars) and *Julia Kuzovkina* (willows)

- descriptions of all major species
- ‘proposed taxonomic classification of the genus Populus’
- ‘classification of the genus Salix by world region’
- used as taxonomic reference for other chapters

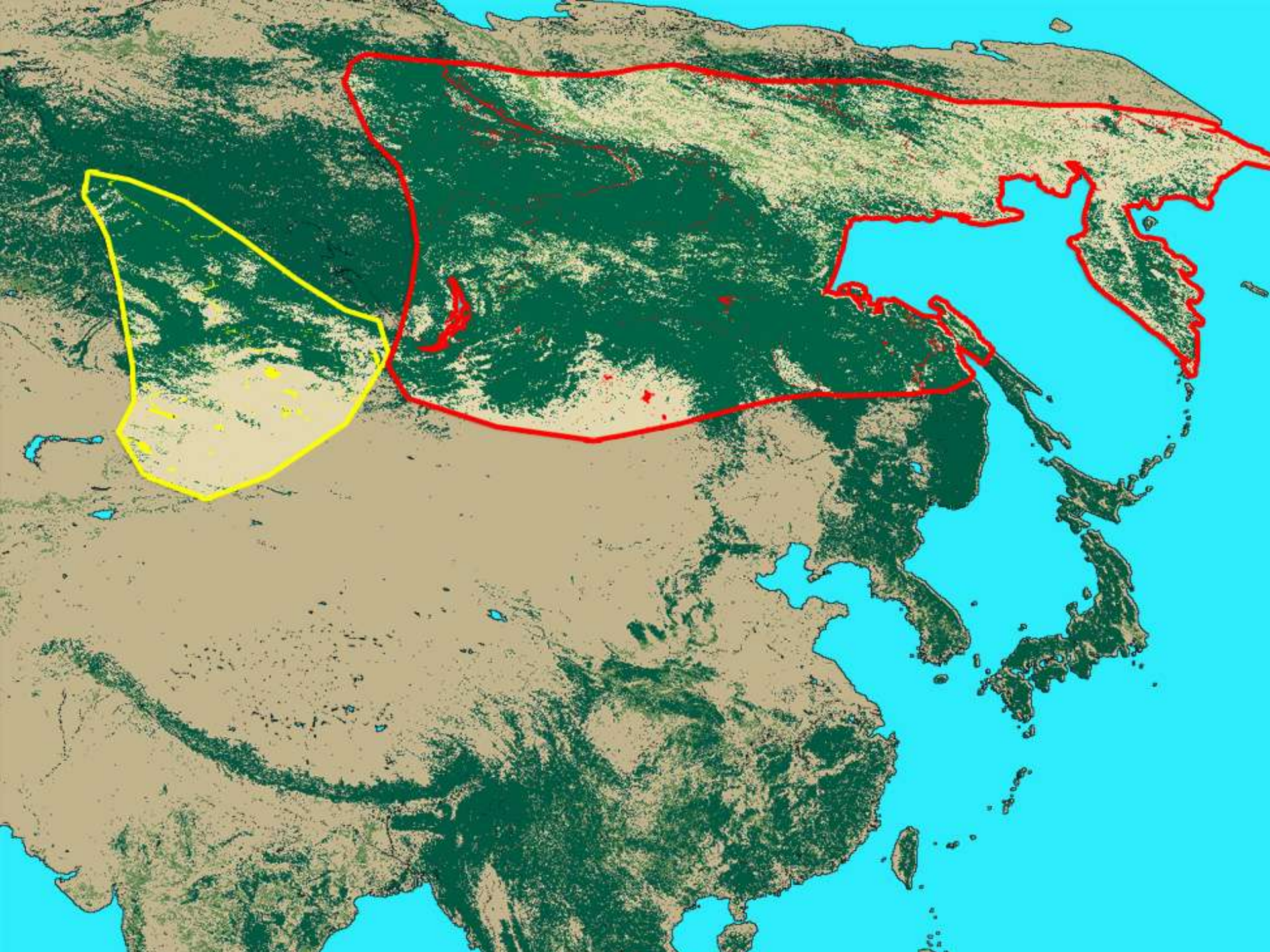


Table 2.2. Proposed taxonomic classification of the genus *Populus*.[a]

Section	Taxon	English common name[b]	Notes and synonyms
Abaso	*P. mexicana* Wesmael	Yaqui cottonwood	Monotypic section
Turanga	*P. euphratica* Olivier	Euphrates poplar	Includes *P. diversifolia*
(Afro-Asian poplars)	*P. ilicifolia* (Engler) Rouleau	Kenyan poplar	Formerly synonymous with *P. euphratica*
	P. pruinosa Schrenk	Desert poplar	Formerly synonymous with *P. euphratica*
Leucoides	*P. glauca* Haines	Asian swamp cottonwood	Formerly *P. wilsonii*
(Swamp poplars)	*P. heterophylla* Linnaeus	Swamp cottonwood	
	P. lasiocarpa Oliver	Heart-leaf poplar	
Aigeiros (Cottonwoods,	*P. deltoides* Marshall	Eastern cottonwood	Includes *P. sargentii*, *P. palmeri*, and *P. wislizenii*
black poplar)	*P. fremontii* S. Watson	Fremont cottonwood	Includes *P. arizonica*

Chapter 3

- **‘Ecology and Physiology of Poplars and Willows’**
- *J. Richardson, J.G. Isebrands, J. Ball*

- natural occurrence, life history and current status of ecologically important species
- 12 poplars, 6 willows
- complements Chapter 2

Chapter 4

- **'The Domestication and Conservation of *Populus* and *Salix* Genetic Resources'**
- *Brian Stanton, Michelle Serapiglia, Lawrence Smart*

- 'Overview of domestication and conservation approaches'
  - - genetic systems; breeding strategies; controlled crossing technique and crossability; testing, selection and deployment; certification, regulation and international trade; molecular approaches; conservation.
- 'Worldwide domestication and conservation programs' – country by country – 26 countries
- 55 contributors worldwide

Chapter 5

- **‘Operational Poplar and Willow Culture’**
- *John Stanturf, Cees van Oosten*

- 33 contributors worldwide
- current practices in different regions for stand establishment, stand tending and production of poplars and willows
- practical techniques and successful practices


GUINNESS

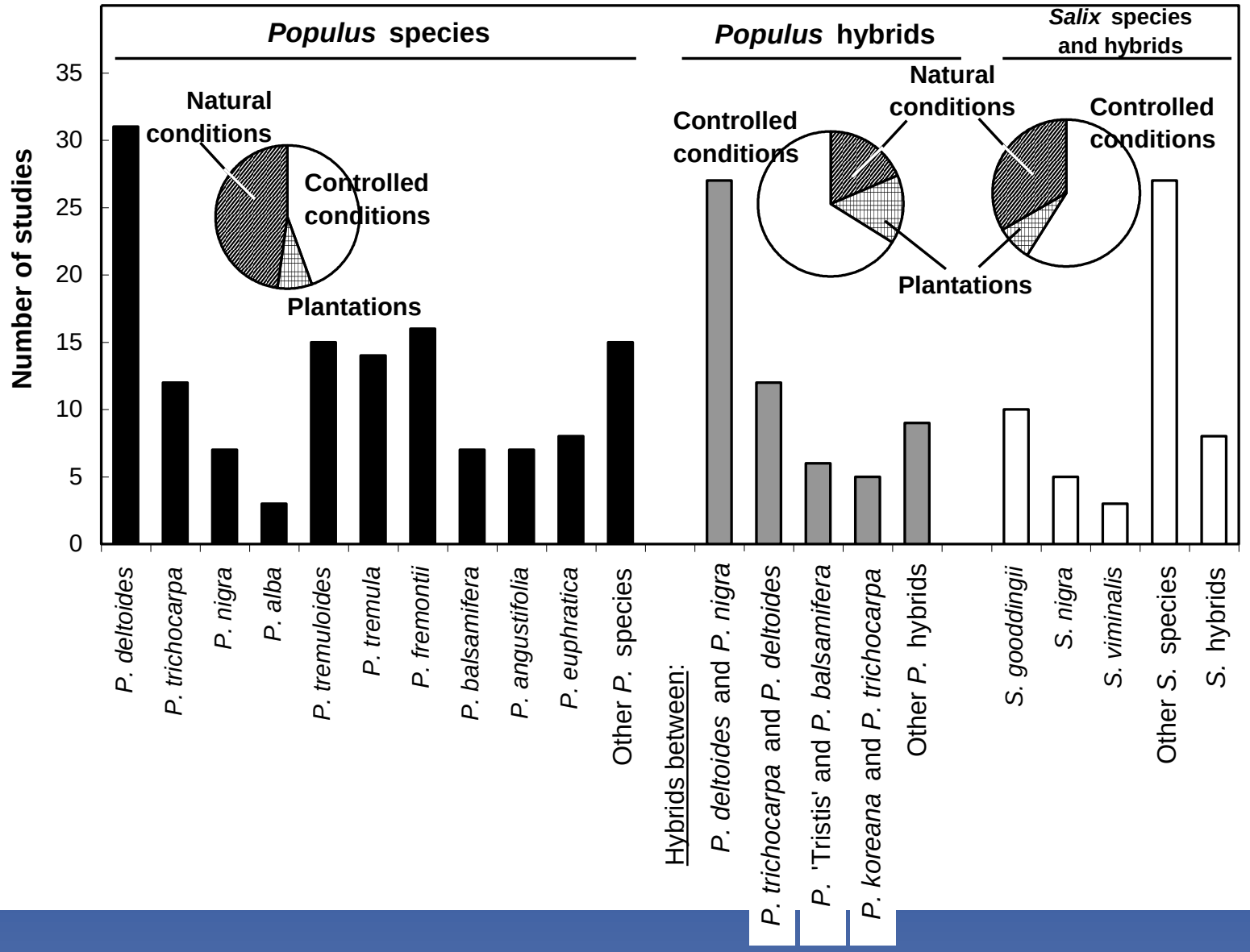
Chapter 6

- **‘Environmental Applications of Poplars and Willows’**
- *J.G. Isebrands* + 26 co-authors worldwide
- windbreaks and shelterbelts
- soil erosion control and riparian buffers
- land restoration
- phytoremediation
- ecosystem services

Chapter 7

- **‘Abiotic Stresses’**
- *Nicolas Marron, Birgit Gielen, Franck Brignolas, Gao Jian, Jon Johnson, David Karnosky, Andrea Polle, Giuseppe Scarascia-Mugnozza, Bill Schroeder, Reinhart Ceulemans*

- edaphic stresses
  - water deficit, desertification, salinity, soil nutrient status
- atmospheric stresses
  - O_3, CO_2, increased temperature, photo-inhibition
- comprehensive annotated list of studies


Populus species
Populus hybrids
Salix species and hybrids
Number of studies
35
30
25
20
15
10
5
0
Natural conditions
Controlled conditions
Plantations
Natural conditions
Controlled conditions
Plantations
Natural conditions
Controlled conditions
P. deltoides
P. trichocarpa
P. nigra
P. alba
P. tremuloides
P. tremula
P. fremontii
P. balsamifera
P. angustifolia
P. euphratica
Other P. species
Hybrids between:
P. deltoides and P. nigra
P. trichocarpa and P. deltoides
P. 'Tristis' and P. balsamifera
P. koreana and P. trichocarpa
Other P. hybrids
S. gooddingii
S. nigra
S. viminalis
Other S. species
S. hybrids

Chapter 8

- **‘Diseases of Willows and Poplars’**
- *Mike Ostry, Mauritz Ramstedt, George Newcombe, Marijke Steenackers*

- disease prevention
  - disease resistance, clonal mixtures, biological control
- selected leaf, stem and root diseases
  - *Melampsora* leaf rust, *Marssonina* leaf spot and blight, *Venturia* leaf blight, bronze leaf disease, *Septoria* leaf spot and canker, *Hypoxylon* canker, other branch and stem cankers, bacterial diseases, root diseases


5260

Chapter 9

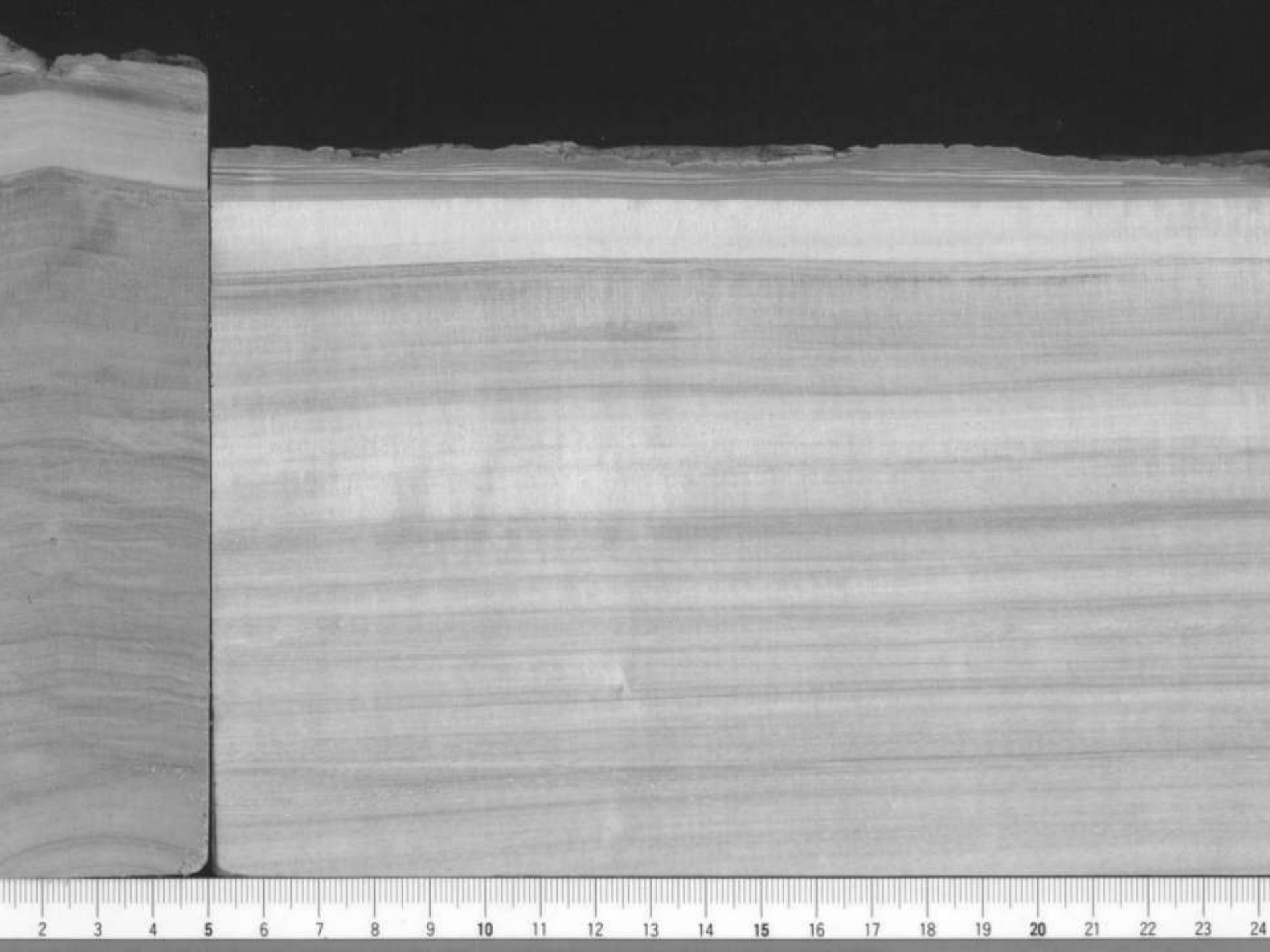
- **‘Insects and other Pests of Willows and Poplars’**
- *John Charles, Sylvie Augustin, Ludovic Nef* +11 other co-authors

- leaf feeders, leaf miners, sucking insects, gall formers, bud and young shoot feeders, wood borers, root feeders, disease vectors, other animal pests, integrated pest management, invasive species and international exchange of plant materials
- selected examples (16) of insect pests of poplars and willows
  - global distribution, description, biology, impact, control, invasive risk

Chapter 10

- **‘Properties, Processing and Utilization’**
- *John Balatinecz, Patrick Mertens, Lieven De Boever, Hua Yukun, Juwan Jin, Joris Van Acker*

- macroscopic and microscopic wood features
- physical, mechanical, chemical properties and natural durability
- processing
- utilization
  - lumber, wood-based composites & panels, glued structural products, pulp & paper, integrated poplar utilization, willow utilization, biomass energy)
- utilization trends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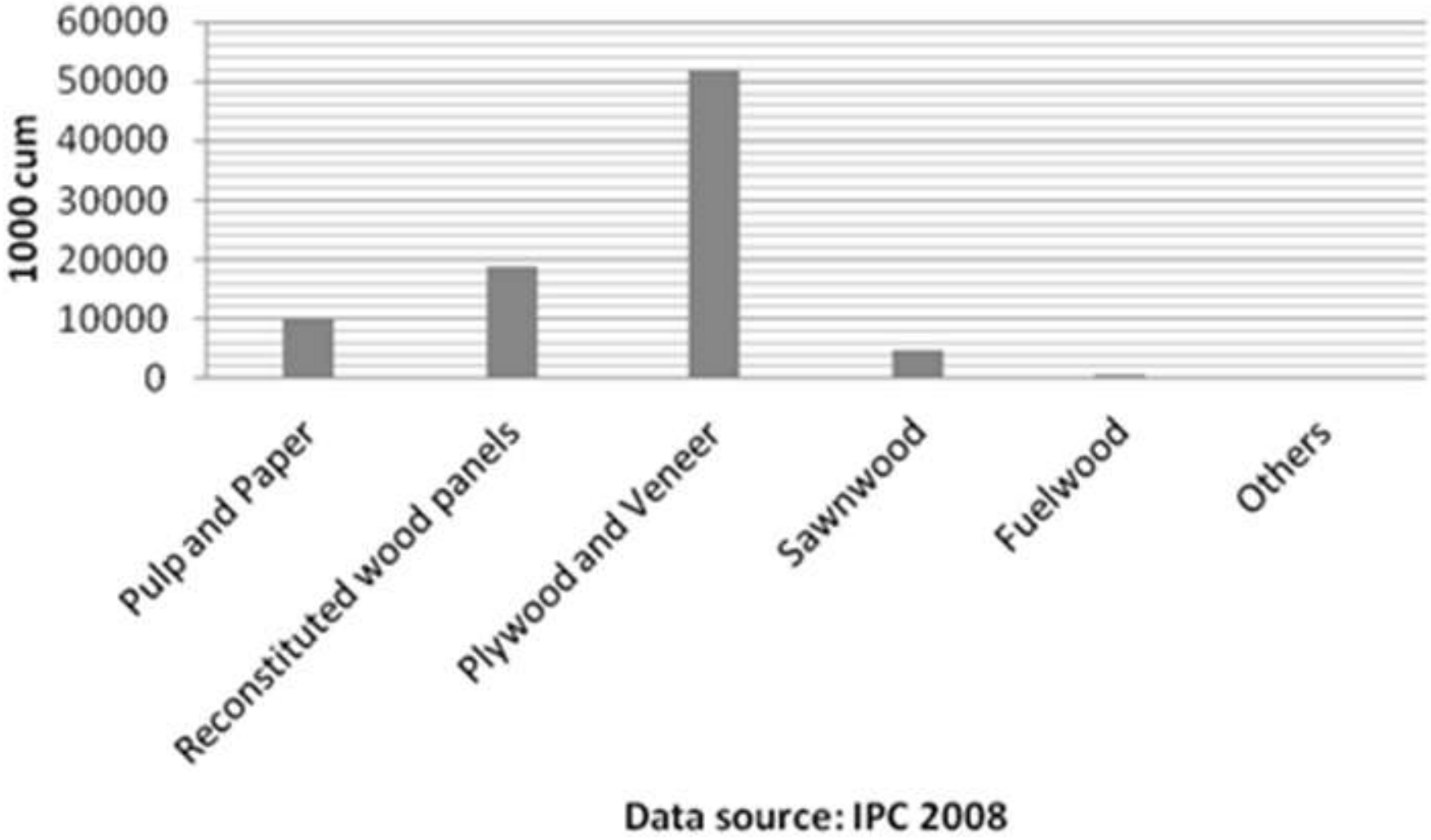
Chapter 11

- **'Markets, Trends and Outlook'**
- *Qiang Ma, Arvydas Lebedys* (FAO)

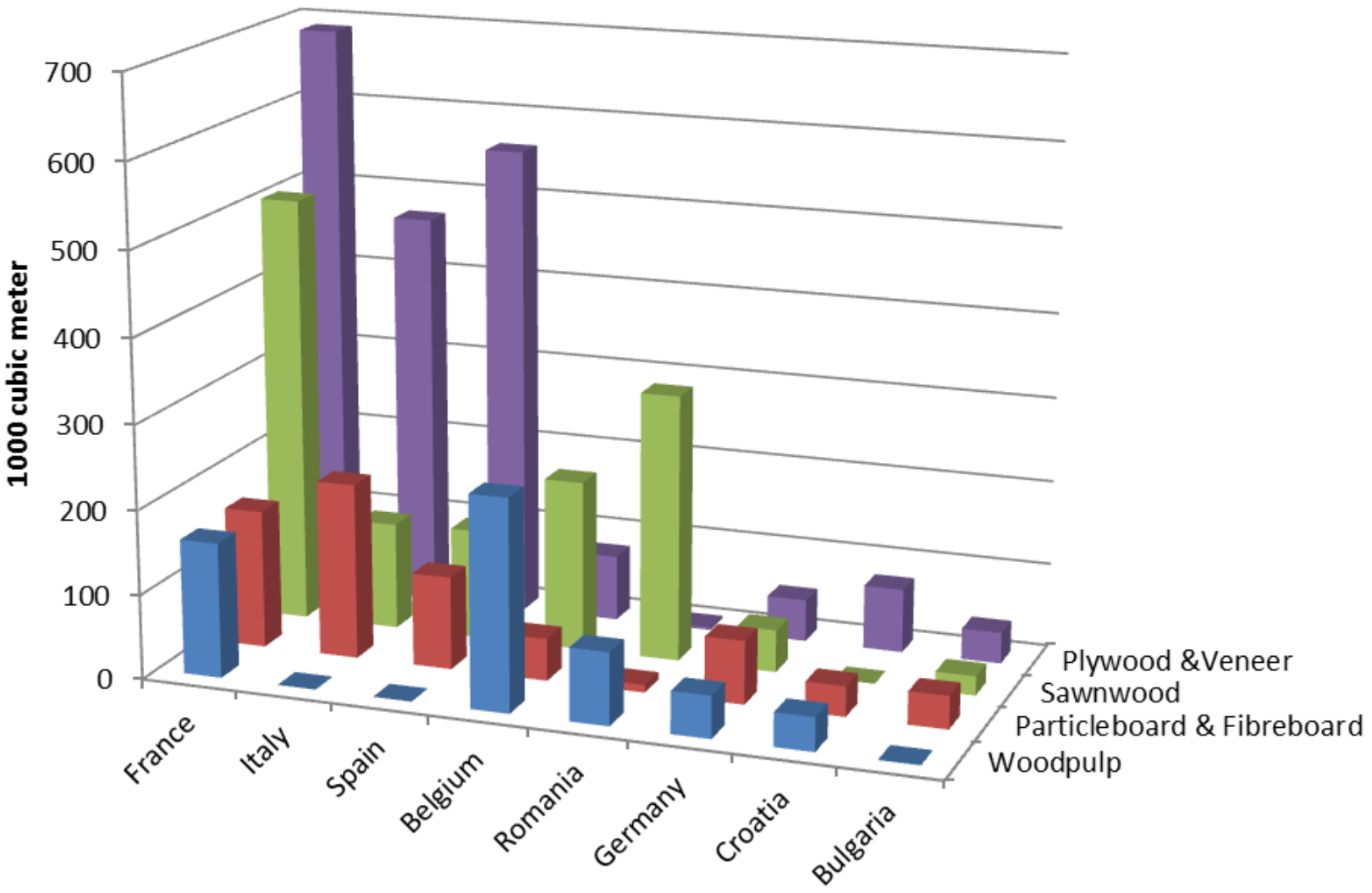
- overall global market trends in wood products
- poplar/willow resources, products production and trade
- evolution of poplar products market in China and Europe
- economic importance of poplar and willow plantations
  - poplar plantations in China
  - willow for energy in Sweden
  - basket willow cultivation in Chile

Production of poplar and willow wood products



Data source: IPC 2008

Main poplar based products in Europe



Data source: FAO 2008, IPC country reports; www.peupliersdefrance.org

Chapter 12

- **‘Poplars and Willows for Rural Livelihoods and Sustainable Development’**
- *Walter Kollert, Jim Carle, Linda Rosengren* (FAO)

- production systems
  - native forests
  - plantations (large-scale industrial, small-scale)
  - agroforestry, trees outside forests
  - bioenergy
- livelihood protection
  - protection of the environment
  - rural landscapes, urban amenity
- 22 case studies from 12 countries worldwide

Chapter 13 Epilogue

J. Richardson

J.G. Isebrands

- The scientist in the field is young, yet building on the solid groundwork laid by those who have gone before, like Dr. Victor Steenackers to whose memory this book is dedicated. A vast amount of information about poplars and willows is contained within the covers of this volume, but much remains to be learned. The future, as always, holds challenges. Poplars and willows, as trees for society and for the environment, can help us move forward sustainably and on a sound scientific base.'.

Vic Steenackers, 1928 - 2010

Acknowledgements

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