PROCEEDINGS OF:

The International Symposium
on
Cool Climate Viticulture and
Enology

Edited by:
D. A. HEATHERBELL, P. B. LOMBARD, F. W. BODYFELT and S. F. PRICE

The Valley River Inn
Eugene, Oregon
June 25-28, 1984

Sponsored and Published by
OREGON STATE UNIVERSITY
Corvallis, Oregon 97331

Departments of
FOOD SCIENCE AND TECHNOLOGY, HORTICULTURE and EXTENSION SERVICE

in cooperation with the
OREGON WINEGROWERS ASSOCIATION

and
OREGON WINE ADVISORY BOARD

OSU Agricultural Experiment Station Technical Publication #7628
<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>1-44</td>
</tr>
<tr>
<td><strong>SESSION I - VINEYARD SITE CLIMATE AND EXPOSURE</strong></td>
<td>1-44</td>
</tr>
<tr>
<td>Some aspects of climate, canopy microclimate, vine physiology and wine quality</td>
<td>1</td>
</tr>
<tr>
<td>Richard E. Smart (New Zealand)</td>
<td></td>
</tr>
<tr>
<td>Site selection for viticulture in cooler climates using local climatic information</td>
<td>20</td>
</tr>
<tr>
<td>Norbert Becker (Germany)</td>
<td></td>
</tr>
<tr>
<td>Panel and open discussion</td>
<td>35</td>
</tr>
<tr>
<td><strong>SESSION II - WINE VARIETIES AND CLONES</strong></td>
<td>45-79</td>
</tr>
<tr>
<td>White grape varieties for cool climate</td>
<td>46</td>
</tr>
<tr>
<td>Helmut Becker (Germany)</td>
<td></td>
</tr>
<tr>
<td>Clonal variability of Pinot Noir in Burgundy and its potential adaptation under other cooler climates</td>
<td>63</td>
</tr>
<tr>
<td>R. Bernard and M. Leguay (France)</td>
<td></td>
</tr>
<tr>
<td>Panel and open discussion</td>
<td>75</td>
</tr>
<tr>
<td><strong>RECENT DEVELOPMENTS IN THE WINE INDUSTRY OF COOLER CLIMATE REGIONS OF THE U.S.</strong></td>
<td>80-137</td>
</tr>
<tr>
<td>Recent developments of the wine industry: East of the Cascade Mountains, Pacific Northwest, U.S.A.</td>
<td>81</td>
</tr>
<tr>
<td>Wade H. Wolfe and Donna J. Hirschfelt (Washington)</td>
<td></td>
</tr>
<tr>
<td>Recent developments in the wine industry: Pacific Northwest, West of the Cascade Mountains</td>
<td>100</td>
</tr>
<tr>
<td>David B. Adelsheim (Oregon)</td>
<td></td>
</tr>
<tr>
<td>Recent developments in California, North Coast viticulture and enology</td>
<td>119</td>
</tr>
<tr>
<td>Zelma Long (California)</td>
<td></td>
</tr>
<tr>
<td>Recent developments of the wine industry: North Central and Eastern United States</td>
<td>128</td>
</tr>
<tr>
<td>J.F. Gallander (Ohio)</td>
<td></td>
</tr>
<tr>
<td><strong>SESSION III - VINE PhysIOLOGY.</strong></td>
<td>138-182</td>
</tr>
<tr>
<td>Influence of light and temperature on vine performance in cool climates and applications to vineyard management</td>
<td>139</td>
</tr>
<tr>
<td>Werner Koblet (Switzerland)</td>
<td></td>
</tr>
<tr>
<td>Trellising and canopy management for cool climate viticulture</td>
<td>158</td>
</tr>
<tr>
<td>Alain Carbonneau (France)</td>
<td></td>
</tr>
</tbody>
</table>
Panel and open discussion. ........................................ 175

SESSION IV - VINE STRESS ........................................ 183 - 239

Managing vineyards to survive low temperatures with some potential varieties for hardiness
Robert M. Pool and Gary E. Howard (New York) .................. 184

Performance of grape vines under wind and water stress conditions
W.M. Kliewer, J.M. Kobriger, R.H. Liva, S.T. Lagier, and Giovanni di Collalto (California) .......... 198

Biological principles of grape cultivation in high-stemmed training systems under the continental climate conditions of southern USSR
Karen S. Poghossian (USSR) ........................................ 217

Panel and open discussion. ........................................ 227

Extra Panel - Overview of Viticulture Sessions .................. 240

SESSION V - WINE QUALITY .................................... 256 - 324

Wine quality evaluation
Peter Duerr (Switzerland) .......................................... 257

Wine quality as influenced by grape maturity, clonal selection and processing techniques
R. Eschenbruch (New Zealand) ..................................... 267

Wine quality as influenced by grape maturity, clonal selection and processing techniques: Experience with Alsace grapes
A. Schaeffer (France) .............................................. 274

Endeavors to produce quality in the wines of Burgundy:
Control of soil, clonal selection, maturity, processing techniques and commercial practices
Pierre DuPuy (France) .............................................. 292

Panel and open discussion. ........................................ 315

SESSION VI - RECENT DEVELOPMENTS OF THE WINE INDUSTRY IN COOLER CLIMATE REGIONS. ......................... 325 - 386

Australia
A.D. Jordan, J. Croser and T.H. Lee (Australia) ............... 326

New Zealand
R. Eschenbruch (New Zealand) ..................................... 345

England
G. Pearkes (England) .............................................. 347
SESSION VII - PROCESSING AND FERMENTATION. 387 - 416

The application of enzymes in grape juice and wine processing
Ekkehard Grampp and Reinhold A. Urlaub (Germany) .... 388

The application of yeasts in winemaking technology
F.K. Zimmermann (Germany) ............................. 402

Panel and open discussion ............................ 410

RECENT DEVELOPMENTS IN PROCESSING AND FERMENTATION RESEARCH. 417 - 480

Recent developments in the application of ultrafiltration
and protease enzymes to grape juice and wine processing
D. Heatherbell, P. Ngaba, J. Fombin, B. Watson,
Z. Garcia, J. Flores, and J. Hsu (Oregon) ............... 418

Improvement of desirable wine-making characteristics in wine
yeasts by hybridization
R. Thornton (New Zealand) ............................... 446

Recent developments in processing and fermentation technologies
for improving the aroma of white wines
M. Bertuccioli, G. Montedoro, and J. Rosi (Italy) .... 460

Questions ................................................. 479

SESSION VIII - ACIDITY-DEACIDIFICATION 481 - 540

Acidity modification and stabilization
Roger Boulton (California) .............................. 482

Options for the management of malolactic fermentation in red
and white table wines
T.H. Lee, G.H. Fleet, P.R. Monk, D. Wibowo, C.R. Davis,
P.J. Costello, T. Henick-Kling (Australia) ............... 496

Commercial evaluation of two new Oregon strains of malolactic
bacteria
Barney Watson, Jr., Nancy Michaels, David A. Heatherbell,
Thomas Henick-Kling, and William E. Sandine (Oregon) .. 516

Panel and open discussion ............................ 530