TEMPERATE BAMBOOS IN ORNAMENTAL HORTICULTURE: DIFFERENTIATORS AND SPILLOVER EFFECTS

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UNIVERSITY OF ANTWERP - OPRINS PLANT - GENICAP
Horticulture and Plantsmen
Evolution of horticulture
Micropropagation via axillary branching
Fundamental Research Applied
Names and brands
Spillover effects for 21st century
Belgium is full of horticultural interest, for the Belgians as a people are interested in plants. They seem to love to garden. They do not seem to be so restless as Americans, they love to stay at home and they build the romance of their lives right about them where they are....
M. Charles Vuylsteke has spent his life in a comfortable but modest house just off the main street of Lochristi. He cross-pollinated a species of Odontoglossum from the mountains of tropical America with Cochlioda nutzliana, an insignificant looking orchid from Peru. The result was a beautiful new hybrid.
Houzeau de Lehaie has done, perhaps, as much as anyone to clear this up, so far as the hardy species are concerned, by quietly studying the growing plants of his hobby and observing their relationships, and the world has had to turn to him for advise.
A plantsman is one who loves plants for their own sake and knows how to cherish them. .... they know the growing plant, wild or cultivated, first-hand. To my mind they are the cream of those in the plant world, a fund of invaluable first-hand information.
The Belgium amateur was mainly interested in greenhouse plants, unlike his British colleague, who collected all kinds of hardy plants in his garden. Perhaps as a result of this, practically nothing is left in Belgium of that glorious period. Devastation during two world wars, the economic crisis of 1930 and the evolution in taste and fashion are responsible for this situation.
Robert De Belder

Ghent is still an important nursery centre. However, the collections have disappeared and only commercially grown plants are produced: Ficus elastica, Clivia, Sansevieria, Azalea indica and tuberous begonia’s. (1969)
Toyoki Kozai

Micropropagation is one of the plant tissue culture technologies for producing a large number of genetically superior and pathogen-free transplant in a limited time and space.
THE BEAUTY OF TEMPERATE ORNAMENTAL BAMBOOS

PHYLLOSTACHYS, FARGESIA, SASA VIA AXILLARY BRANCHING
MICROPROPAGATION
MASS PRODUCTION OF BAMBOO
PHYTOHORMONE ANALYSIS

PRESENT AND ACTIVE IN VERY SMALL CONCENTRATIONS IN PLANT TISSUE (0.01 – 1000 PMOL/G FRESH WEIGHT)

1/1000000000000
Cytokinin metabolism

AMP + side chain precursor $\rightarrow$ DHZR-P $\rightarrow$ DHZR $\rightarrow$ DHZ $\rightarrow$ DHZNG

ATP/ADP $\rightarrow$ AMP

iPA-TP/iPA-DP $\rightarrow$ iP $\rightarrow$ iP

iPA $\rightarrow$ iP

iPG $\rightarrow$ Z-N-G

DMAPP $\rightarrow$ iP

Ado $\rightarrow$ iP

amp $\rightarrow$ side chain precursor $\rightarrow$ DHZR-P $\rightarrow$ DHZR $\rightarrow$ DHZ $\rightarrow$ DHZNG
Quantification requires sensitive analytical techniques

Cytokinins

- bioassays
- RIA/ELISA
- HPLC-RIA/ELISA
- HPLC-DA
- LC-MS
- ES micro LC-MS/MS
- ES cap. LC-MS/MS

4 minutes per run for separation of all different cytokinins
Detailed analysis

Bambusa balcooa
(leaf)

pmol/g fresh weight

B. balcooa leaf Sample 1
B. balcooa leaf Sample 2
B. balcooa leaf Sample 3
DIRECT RESULTS

LABO
- SHORTER CYCLES
- DIRECT ROOT INDUCTION
- RATES SUCCESS INCREASE
- FASTER ROOTING

GREENHOUSE
- HEALTHIER PLANTS
- FASTER ROOTING
- FASTER GROWTH

BETTER QUALITY
BETTER PRODUCTION PLANNING
COST REDUCTION
TOWARDS MECHANIZATION
Transplant succes

FARGESIA RUFA 94-98%

IN ABSOLUTE NUMBERS:
MAX 2 PLANTS PER TRAY
Names and Brands
Bamboo Select®

The Green Standard
BRAND NAMES
GREEN PANDA, BLUE PANDA, SUNSHINE
NURSERY
LACIJNS

AREA | 3 HA | RIJKEVORSEL | PRODUCT | PURE BAMBOO
However, the widespread use of micropropagated plants is still restricted because of its high production costs, mostly attributed to its low growth rate and a significant loss of plants in vitro by microbial contamination, poor rooting, low percent survival at the ex vitro acclimatization stage and high labor costs.
<table>
<thead>
<tr>
<th>Process</th>
<th>No. Recipients</th>
<th>No. Subcultures</th>
<th>No. Persondays</th>
<th>Index Persondays</th>
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<tbody>
<tr>
<td>Axillary branching</td>
<td>1600 jars</td>
<td>6</td>
<td>94</td>
<td>100 (current)</td>
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<tr>
<td>Somatic embryogensis</td>
<td>250 Petri, 600 jars</td>
<td>3</td>
<td>45</td>
<td>47</td>
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<td>Transfer of petridishes</td>
<td>1000</td>
<td>2</td>
<td>&lt;10</td>
<td>&lt;10</td>
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</tbody>
</table>
INCREASING RESISTANCE AGAINST DROUGHT

25 DAYS WITHOUT WATERING
TOWARDS MECHANISATION

REDUCE PRODUCTION COSTS THROUGH INTELLIGENT MECHANISATION AND ROBOTICS
CHALLENGES

UNDERSTANDING DIVERSITY & CHARACTERISTICS

GENETIC IMPROVEMENT: FLOWERING & HYBRIDISATION
GENETIC MODIFICATION
98 YEARS TO GO

THE DYNAMIC GENOME
SYSTEMS BIOLOGY
BIOMATHEMATICS
PHYSICS AND NANO
BIOCHEMISTRY
THANK YOU FOR YOUR ATTENTION