

Fourth Edition

Nursery Management

Administration
and Culture



Stratford University of Technology



11051000500636

Harold Davidson
Roy Mecklenburg
Curtis Peterson

Contents

PREFACE xi

PART I: GENERAL

1 BRIEF HISTORY OF THE NURSERY INDUSTRY 1

Early Eastern Nurseries	2
Early Midwestern Nurseries	5
Early Western Nurseries	6
Early Florida Nurseries	7
Early Industry Observations	8
Legislation and the Automobile Affected Development	8
Early Garden Centers	9
Census Data on Nurseries	9
A Changing Industry	10

2 THE NURSERY INDUSTRY 21

Nursery Classification	21
Affiliated Areas	29
Trade Organizations	31

Specialized Associations	33
State, Regional, and Local Organizations	34
Centers of Production	35

PART II: ADMINISTRATION

3	MANAGEMENT APPLIED TO NURSERIES	40
	Determining goals	41
	Planning	43
	Organization	44
	Leadership and Coordination	52
	Managing a Non-English-Speaking Workforce	58
	Employee Motivation, Evaluation, and Rewards	58
4	SELECTING A NURSERY SITE	65
	Ecological Factors	65
	Economic Factors	69
	Sociological Factors	71
	Biological Factors	71
5	ORGANIZATION AND DEVELOPMENT OF THE NURSERY SITE	73
	General Considerations	73
	Specific Considerations	76
	Planting Designs	78
	Container-Production Areas	86
	Production Programming	90
	Estimating Plant Material Requirements	90
	Estimating Space Requirements	92
	Production Land Utilization	94
6	LAWS, REGULATIONS, AND CODES	96
	Federal Laws and Regulations	97
	State and Local Laws	109
	Metric Equivalents	109
	Codes	110
7	FINANCIAL MANAGEMENT	119
	Function of Financial Records	119
	Financing a Nursery Business	120
	Evaluation of Alternative Investments	123
	Negotiating a Loan	128
	Assessing Value of a Nursery Crop in the Field	131

Information Needed About the Lending Institution	132
Computing the Future Cost of a Nursery Crop	133
Using Financial Information to Evaluate Management	134
Discretionary Spending	136
Determining Profit	137
Cost of Production	137
Accounts Receivable	151
Total Nursery Profits	151
Cash-Flow Analysis	153
Ratio Analysis	154
8 WHOLESALE MARKETING NURSERY CROPS	159
Specialization in Production Nurseries	160
Types of Nursery Crops Needed by Landscapers	161
Type of Nursery Crops Needed by Garden Centers	162
Type of Nursery Crops Needed for Mail-Order Nurseries	164
Wholesale Nursery Sales Organizations	165
Standards	168
Standard Units of Nursery Stock	176
Shipping Agreements	176
Warranty	176
Nursery Crop Marketing Channels	177
9 NURSERY INVENTORY MANAGEMENT	185
Plant Inventory	185
Equipment Inventory	196
Supplies	197
10 SHIPPING NURSERY STOCK	201
Plant Material	201
Buyer's Responsibilities	204
Seller's Responsibilities	207
Carrier's Responsibilities	213
Regulated Carriers	215
PART III: CULTURE	
11 NURSERY CROP PRODUCTION	220
Planning the Operation	221
Liner Production from Seed	224

Liner Production from Vegetative Methods	224
Small Plant Culture	225
Field-Grown Crops	229
Container-Grown Crops	240
Harvesting Methods	248

12 SOIL AND NUTRITION MANAGEMENT FOR FIELD-GROWN PLANTS 257

Soil	258
Essential Elements	258
Soil Reaction	261
Modifying Soil Reaction	262
Cation Exchange Capacity	271
Nutrient-Element Balance in Plants	272
Leaf Analysis	273
Soil Tests	274
Types of Fertilizers	275
Soluble Salts	280
Fertilizer Recommendations	281
Time of Application	289
Organic Matter	291
Soil Conservation	296
Soil Conservation Practices	297

13 MEDIA AND NUTRITION MANAGEMENT FOR CONTAINER-GROWN PLANTS 300

Functions and Criteria	301
Ingredients	305
Container Media	308
Chemical Supplements	313
Testing and Modifying	315
Media Pasteurization (Sterilization)	321
Post-Treatment	324

14 IRRIGATION OF NURSERY CROPS 328

Sources of Water	329
Water Quality	329
Soil Moisture Determination	332
Water-Absorbing Hydrogels	335
Distribution Systems	338
Watering Field-Grown Crops	340

Watering Container-Grown Plants	343
Purification of Recycled Water	358
Frost Protection	359
Excess Soil Moisture	360

15 MODIFYING PLANT GROWTH AND DEVELOPMENT IN THE NURSERY 364

Shoot Modification	366
Root Modification	376
Temperature Responses	380
Flowering and Fruiting	380
Winter Survival	386

16 MANAGING WEEDS, INSECTS, AND DISEASES 396

Integrated Pest Management Programs	397
Weed Control	400
Invasive Plants	417
Insect Control	420
Disease Prevention, Monitoring, and Control	429
Disease Monitoring	434
Disease Control	436

17 NURSERY STORAGE FACILITIES 446

Storage Facilities	448
Additional Facilities	455
Factors Involved in Storage of Nursery Crops	457
Problem Areas	465
Storage of Chemicals	468

18 THE PRODUCTION AND USE OF COMPOST 472

Planning a Composting Facility	474
The Composting of Landscape Wastes	475
Factors Affecting the Rate of Composting Landscape Wastes	477
Composting Sewage Sludge (Biosolids)	484
Use of Compost in the Nursery Industry	485
Public Concerns in the Use of Compost	486
Field Application of Compost	487
Use of Compost in Potting Mixes	489

PART IV: APPENDICES

A	GUIDE TO PLANT LOCATORS	493
B	PARTIAL LIST OF BOOKS AND BULLETINS PERTAINING TO AREAS OF NURSERY MANAGEMENT	500
C	ADDRESSES OF NURSERY-RELATED ORGANIZATIONS	504
D	TRADE JOURNALS RELATED TO THE NURSERY INDUSTRY	508
E	APPROXIMATE METRIC CONVERSIONS	510
F	RATE PER 1000 SQ FT NOMOGRAPH	511
G	RATE PER ACRE NOMOGRAPH	512
H	FERTILIZER PROPORTIONER NOMOGRAPH, 100 ppm	513
I	DETERMINING THE WEIGHT OF B&B PLANTS	514
J	APPROXIMATE WEIGHT OF B&B PLANTS	517
K	AREA OF CIRCLES IN SQUARE FEET	518
L	VALUES FOR SELECTED RATES OF i	519
M	RELATIONSHIP BETWEEN T, RH, VP, and VPD	520
	INDEX	521