

GOVP1200001027

635.9  
L293 B

최 종  
연구보고서

盆栽素材養成機具 開發에 依한 高級盆栽의  
大量生産 및 早期收穫에 關한 研究  
A Study On Early and Mass Production of High-Quality  
Bonsai through Development of Cultivation Instrument

연구기관  
강원대학교

농림부

“ ”

1999. 12. .

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:  
:  
:

“ ”

UR

量的

가 多年間 露地栽培

가

가

가

質的生產

日本 , 量的生產

中國

가

가가

가

가

가가

早期出荷

가

1)

가가

, , 가 ,

가

3

樹種別 , , 가

2)

生産工程體系

Vinyl house

樹種

가가

盆栽特性

가

素材

究明

1)

植栽 , 가 ,

1 2年

가

貌様木

誘引

A

B ·C

D ·E

4種 가

가

A

가

B

가

3種

根上

A

B

(Base)

八方性

(Base) 4種

掘取

完成木

熟成培養盆(8 )

固定培養盆(1 )

(8 ) 3種

14種

1件

8

1,000坪

20種

8,000

樹性

가가

가 가 究明

, 2

掘取

固定培養盆」

1

完成木

2)

200

Vinyl house

15種

2,000

植栽

2

樹種

가

究明

가가

가

가가

가 가

가

가

가

## SUMMARY

There have been some problems of high labor and low productivity in the existing systems of bonsai cultivation. This research developed cultivation instruments and techniques solving the present problems and producing bonsai with high quality within shorter periods.

### 1) Development of cultivation instruments and production techniques

Cultivation instruments were developed to shape stems, branches, and root in a desirable way within one or two year after planting of seedlings.

The following 14 instruments were developed: 4 types of stemleaders, 3 types of branch leaders and a branch-support ring, 2 types of root leaders and 2 types of root-leader bases, and 3 types of cultivation pots. Of those, 1 utility model and 8 designs have been registered.

Production techniques were tested in an experiment station applying the above instruments developed. Eight-thousand tree seedlings of 20 species were planted in the field of about 3,300m<sup>2</sup>. The seedlings were cultivated for 2 years, transplanted into fixed pots, and then grown toward complete shapes for 1 years. Proper cultivation instruments were used in each production stages considering growth characteristics of the tree species. The result was that the techniques are less labor-intensive, more productive, and practical. Moreover,

harvesting periods were shortened in the production systems.

## 2) Cultivation techniques for early production

Two thousand tree seedlings of 15 species were planted in a vinyl house of about 660m<sup>2</sup>, and their growth conditions for 2 years were compared with those from an open-air field. It was finally found that the growth was significantly better and earlier production was certain in the vinyl house has another advantage which can cultivate less cold-resistant species and therefore broaden a range of species selection for market supply. Cultivation techniques by the use of vinyl house and instruments developed was quite effective for early production of bonsai as well as for high productivity and value added.

This project developed a new practical techniques and systems which can make mass and early production of bonsai with high quality through input of less labor. Interest in bonsai is now expanding in landscape horticulture and other fields concerned, and bonsai export of our country is also increasing.

Results from this research will make a great contribution to enhancing of bonsai cultivators' competitive position in world markets and to improving of their annual income.



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가.	1
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1.	
2.	
가. 1	
1)	
2)	A
3)	
4)	
5)	
6)	A
. 2	
1)	B. C

2) 가            A B

3) 가

4)                B

. 3

1)                D E

3.

3

1

2

1.

2.

3

1.

가.

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2.

가.

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3.

4

1

1

盆栽

1970

1980

1985 1

「 」 80

1986 2

「 」 ( . ), ,

3

1991 8 「 」

가

14

500

가

露地栽培 100

house

30

「 」 가

20

300

7

300

1999

40

가

300

1,000

가

가

5

가

가

1990

「 」

4

가

IMF

60

40 \$

自國 樹種

質的

日本 , 量 的

日本

中國

日本

가

가

休耕

가

本 研究

究明

가

1)

가가

, , 가

가

3

, , 가

究明

2)

施設 露地 M nyl house  
樹種 植栽



2

1

1980 가 가

日本 自求

가 移轉

1980 가

山採 格

가

가

曲 曲幹樹形

가 ,

가 樹皮 가 가

Stress

가 根上樹形

house

가 가 가 ,

曲 2 曲  
가  
가

가  
研究 가

金型 (P.P) (P.E)  
가 樹形 가  
2

美的  
究明 試驗 圃

2  
1.  
가. 1  
1994 3  
250 가

金型

가

1

A

( 8 )

( 1 )

2

1

가가

1

B C

가

A B

가

B

3

1, 2

「 」 가

曲

豆盆栽

D E

2.

1

1,000 ( vinyl house

200 , 800 )

1 1997 3 20 樹種 20種

8,000

2 1998 3 10

2

3 1999 3 , 3

「  
가가

3

1.

가.

가

가 , ,

3

. 3

14

樹種別

2.

가. 1

1)

가)

:

8 (24cm)

3mm

가

5mm

가

(P. P)

)

:

가

가

가 가

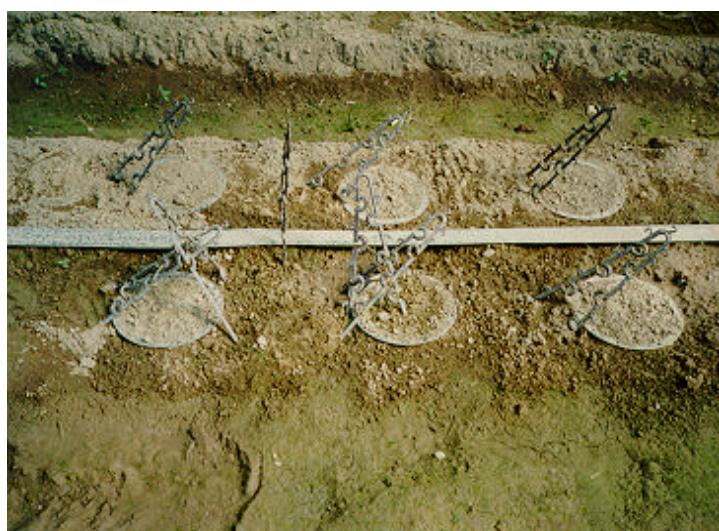
)

30-0235786

1999 1 12



( 1)



( 2)

2) A

가) : 35cm x12cm

(P.E) .

) :

가

根立

가 가 . , , ,

) 0165319

1999 10 15

30-0235785

1999 1 12



( 3) A



( 4) A



( 5) A

3)

가) :

(P.E) .

)

(1) P.V.C (40 60cm) 10cm

( )

10 15cm .

, 가

가 가 가 .

가 가 .

. , , .

(2) 1 가 PE 가

가

가 .

가

(3) M nyl

house ,

house pi pe

)





( 6 )



( 7 )



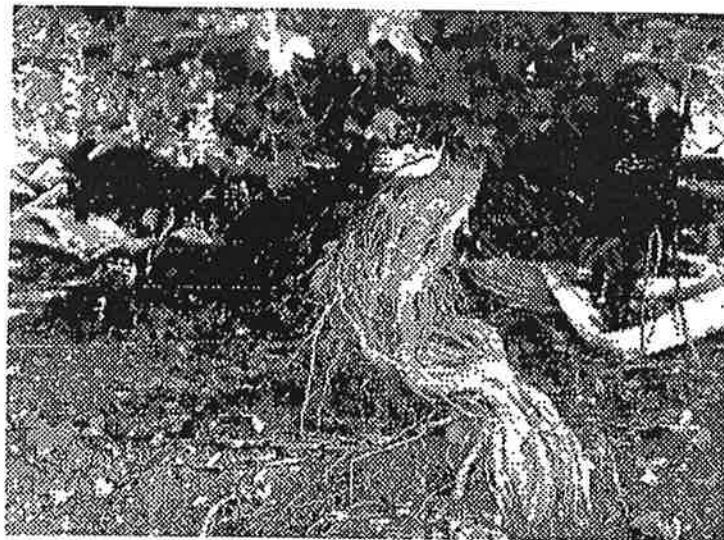
( 8 )



( 9 )



(사진 10) 근상유인대 이용시의 뿌리발달상태



(사진 11) 근상유인대가 제거된 뿌리의 노출상태



( 12)

pi pe

4)

가) : , 가

12cm 2mm 가

(P.P P.E ) .

)

(1)

가 ,

가 가 가 .

(2) :

가

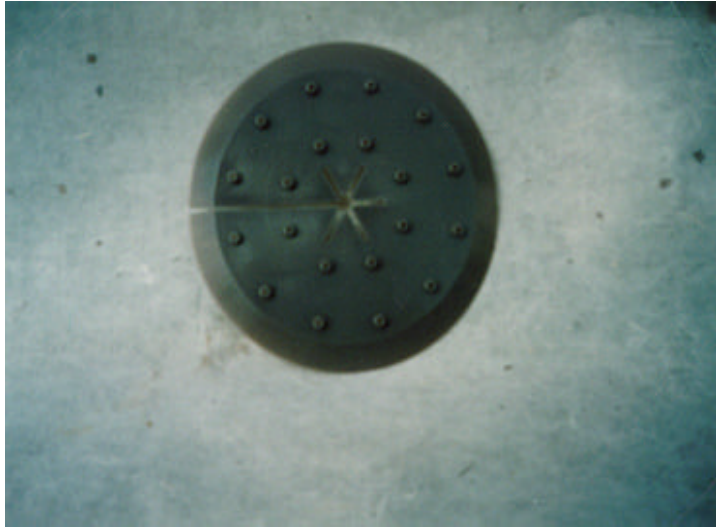
, 가 .



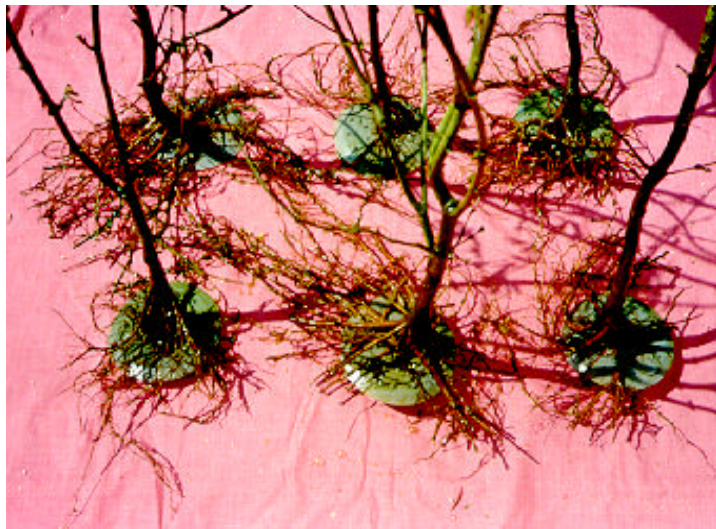
)

181015

1996 6 5



( 13)



( 14)



( 15)

5) ( 2 )

가) :

8

(24cm) 1 (30cm)

가 5mm

(P.P) .

) :

가 , , , ,

. 가 가

, 가가 .

) 30-0242476

1999 5 29



( 16)

( 8 , 1 )



( 17)

6) A  
A 95

가) : 45cm

가

)

:

가

5

가

가 가

)

166226

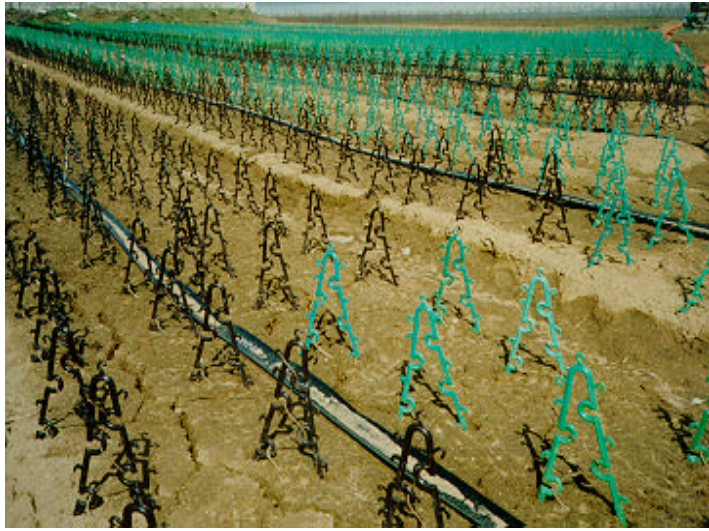
1995 7 13



( 18)

A





( 19)



( 20)



( 21)

3

. 2

1) B C

1 A (外曲)

(内外曲)

(曲)가 가

1 「 A 」

2 「 B C」

가) : B 26cm 7cm 2

가

가

5 가 .

\* C 19cm 6cm .

) : 45°

(外曲) (内曲)

1 3 (曲)가 가 가

5 가가

가 가 .

) 30-0247196

1999 8 30



( 22)

B. C



( 23) 「 B C 」



( 24) 「 B C 」 1





( 25) 「 B C 」

1 曲

2) 가 (A B )

가) : 16cm 3cm(A )

가 가 .

. B 13cm, 2,5cm .

) : 가 가 ( ,

, )

가 가 . 가 가

1 , 2 3 가 「 」

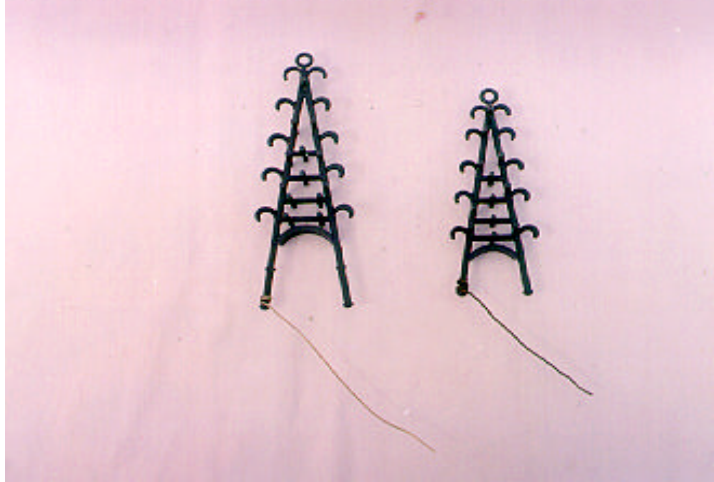
가 가

100% 가 . 가 」

(豆盆栽) 「 」

) 30-0247196

1999 8 30



( 26) 가 (A B )



( 27) 가



( 28) 가

3) 가

가) : 29cm 가 가

(上下)

) : 가 가 ( , , ) 가

1 가 가

」 , 까 」

가

)

30-0242475

1999 5 29



( 29) 가



( 30) 가



4) (B )

가) : 25cm 7cm 12cm

3

가

, (曲)가 가

) : B

(根上)

PVC ( 30cm × 6cm )

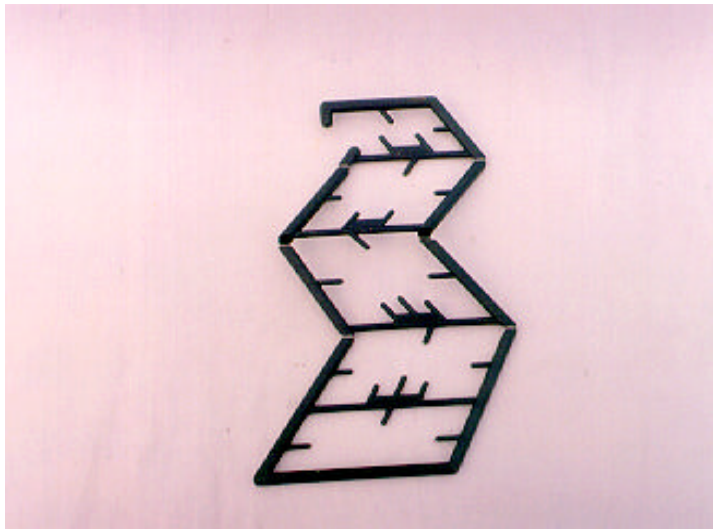
가

(B ) , (曲)가 가

가 가

) 30-0245814

1999 8 2



( 31) B



( 32) 「 B 」



( 33) 「 B 」 曲가



( 34) 「 B 」 1

. 3

1) D E

가)

(1) D 10cm 3.5cm, 1.2cm

2 가

가

(PP PE)

1 2

E 7cm 2cm 1cm 樹高 10cm 豆盆栽

)

(1) (樹高 20cm ) ( 10cm )

가

(2) 1 3 가

曲 가

(3)

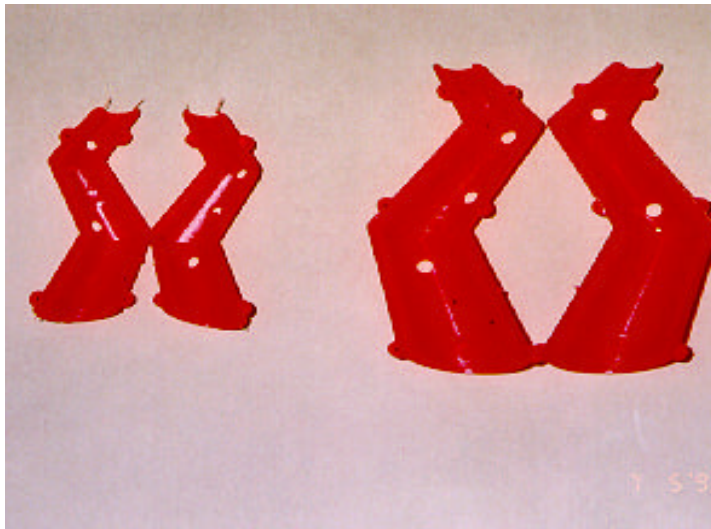
「 」가

(4) 가

가

(5) D 根上 」

)



( 35)

(D E )



( 36) (D E )



( 37) (D E ) 根上

3.

가.

< 1 >

1)

曲	<p>· <u>                  A B C D E</u></p> <p>                                  가 가</p> <p>(            ).</p>	<p>·                                    가            (            ).</p>
	<p>· 1 1 1,000</p>	<p>· 1 1 200 300</p>
	<p>·</p> <p>( 10            ).</p>	<p>·                                    가            .</p>
	<p>·                                    .</p>	<p>·                                    .</p>
	<p>·            「            」            가</p> <p>                                  5            ( 5            )</p>	<p>·                                    .</p>
	<p>·            가</p> <p>                                  曲</p>	<p>·            가</p> <p>(                                    stress            ).</p>
	<p>·            曲</p> <p>가                                    1 1 1,000</p>	<p>·            曲                                    가</p> <p>                                  1 200                                    1</p>
	<p>·                                    1 4</p>	<p>·                                    「            曲            」</p> <p>                                  5</p>
	<p>·            가 (            5            )            150</p> <p>·                                    ( 1            )            30</p> <p>( 30,000 ÷ 1,000 )</p> <p>·                                    ( 1            )            30</p> <p>·            (            )            10%</p> <p>·            (            )            10%</p>	<p>·            가 (            )            20</p> <p>·                                    ( 1            )            300</p> <p>( 60,000 ÷ 200 )</p> <p>·                                    ( 1            )            300</p> <p>·                                                                       0%</p> <p>·                                                                       0%</p>

< 2 >

2) 가 . 가

가	$\frac{\text{가} \quad A \quad B \quad \text{가}}{\text{가}}$ $\left( \quad , \quad , \quad \right)$	$\text{가} \quad \left( \quad , \quad , \quad \right)$
	$\frac{3}{100} \quad 1 \quad 1$	$\frac{3}{50} \quad 1 \quad 1$
	$\frac{\quad}{\quad} \quad 10$ $\text{가}$	$\text{가}$
	$\frac{\text{가}}{\text{가}}$ $\frac{\quad}{5}$ $\text{가}$	$\text{가}$
	$\frac{\text{가} \quad \text{가} \quad \text{가}}{\quad}$	$\text{가}$ $\text{가} \quad \text{가}$
	$\frac{\text{가}}{\text{가}} \quad \left[ \quad \right]$	$\text{가} \quad \text{stress}$
	$\frac{\quad}{\quad} \quad 100$ $\left( 50 \div 5 \times 10 \right)$ $\frac{\text{가}}{\quad} \quad 300$ $\left( 30,000 \div 100 \right)$ $\frac{\quad}{\quad} \quad 300$ $\left( 30,000 \div 100 \right)$ $\frac{\quad}{\quad} \quad 10\%$	$\frac{\quad}{\quad} \quad 100$ $\frac{\text{가}}{\quad} \quad 1,200$ $\left( 60,000 \div 50 \right)$ $\frac{\quad}{\quad} \quad 1,200$ $\left( 60,000 \div 50 \right)$ $\frac{\quad}{\quad} \quad 0\%$

< 3 >

3) (A B).

(根上)	$\frac{A}{B}$	, (根上) 2
가	가	가 가
「 」	가	가
「 」 (根上樹)	根上樹	가가
A		
가 A 500 B 150 (3 ) 200 (60,000 ÷100 ) 600 50%		가 50 50 ( ) 100 (60,000 ÷100 ) 600 0%



< 4 >

4)

	가	( 3 )
	가 가	
	가	
	가	( 10% )
	가 ( 3 ) 50 30 ( 30,000 ÷ 1,000 / 1 ) 30% 10%	( 가 ) 10% ( 10% )

< 5 >

5)

		2
	house	house
가 가 가 가		가 10%
(가)가 15 가 가		, 가 가
가 300 100% (가) 50% 10%		가 300 10%

< 6 >

6) ( 8 , 1 )

· ( 8 , 1 )	· ( )
· 가 가	· 가 ( 10% )
· 가 ( , , ) 가	· 가
· 가 ( ) 300 · ( 1 ) 300 ( 30,000 / ÷100 ) · 10% · 20%	· 가 ( ) 300 · 300 ( 30,000 / ÷100 ) · 10% ·

< 7> (10a. 3000 . 3 )

:

-3,000 (1 ) ( , , )	100 ( )	70
· (1 )	20( )	100( )
· (1 )	20( )	100( )
· ( 5 × ) 1 20	200	200
· ( 8 ×3 )	100	100
·가 ( 2 ×3 )	200	200
· (3 )	150(3 )	100 (2 )
· (1 )	100	60
·	100	200
·	0	300
·	0	600
( 300 )	0	600
·가	300(가 가 )	600( )
·가	300( )	600( )
	1,590	3,230
(1 8 /30,000 )	5,962,500	12,112,500

< 8> (10a 3,000 3 )

( : )

·	300 ×200	60,000	60,000
·	20,000 ×2	-	40,000
· 代	30,000 ×300	900,000	900,000
·	3,000 ×300	900,000	-
·	3,000 ×50	50,000	-
·	3,000 ×20	-	60,000
· 代	( , )	300,000	300,000
·	300㎡ Roll ×2 ×30,000	60,000	60,000
·가	2,700 / 90% ×300	810,000	-
·	2,700 / 90% ×300	-	810,000
·가	2,700 / 90% ×100	-	270,000
· house 200	200 ×20,000 (15 가)	800,000	800,000
·	(15 ' , 가)	200,000	200,000
· (3 )	1 / 8 / 30,000	5,962,500	12,112,500
		10,042,500	15,612,500

1) 「

」 , 가

2) 2 1

house 200

15 가 3 100

< 9> (10a 3,000 3 )

	代		代	
A (15,000 )	40% (2,700 ×40%)	16,200,000	30% (2,700 ×30%)	12,150,000
B (10,000 )	40% (2,700 ×40%)	10,800,000	40% (2,700 ×40%)	10,800,000
C (5,000 )	20% (2,700 ×20%)	2,700,000	30% (2,700 ×30%)	4,050,000
( )		29,700,000		27,000,000
	29,700,000 - 10,042,500	19,657,500	27,000,000 -15,612,500	11,387,500

1) 3,000 10% 2,700

2) 10a(300 ) 6,552,500 22,000

1) 100-1,000% , 300

가 50%

2) , , 가 10-50%

가 .

3) 10%

3

1

2 ,

1

究明

V nyl house

가 가 .

2

3

2

1.

가.

100

V nyl house 200

10

「 」

(H)

가

(R)

「 」 「 」 「 」

2.

가.

V nyl house

200

200

15

2

가 (R)

「 」 「 」

3

1.

가.

가가

2 Vinyl house

15

2.

가.

1)

2

「 」

1

「 」

2) 1997 3 28

「 」

10

「 」

10」

1

3) 2 1998

「 11」

, , ,

가

4) 2

98 3 25 3

「 」



가

5) 98.8. 3. 「 」 50%

7 가 가

2 , 10

10 Sampling

(H) 가 (R)

「 」 「 」



( 38)



( 39)



( 40)



( 41) 가



( 42) 2



( 43)

		( : R)								
		3 28	4 30	5 31	6 30	7 31	8 20	9 30	10 25	
		5	5.1	5.8	7.1	7.7	8	11	13	1
		5	5.1	5.5	6.3	6.5	7	10	12	
		3.7	4	5	7	7.2	7.5	9	10	1
		3.7	4	5	6.5	6.7	7	9	11	
		5.5	5.6	5.7	5.8	6	6	7	7.5	1
		5.5	5.5	5.6	5.7	5.8	6	7	7.5	
		15	16	18	20	21	22	24	24	1
		15	15	17	20	21	22	25	26	
		18	18	20	22	23	24	26	26.2	1
		18	18	20	22	23	24	28	29	
		18	18	19	20	21	22	25	25.3	1
		18	18	20	21	22	23	27	28	
		5	5.5	6	8	8.5	9	10	11	1
		5	5.1	5.5	6.7	7	7.5	11	12	
		6	6.1	6.5	7	7.3	7.5	10	11	2
		6	6.1	6.5	6.8	7	7	10	11	
		7	7	7.2	7.8	8	8	11	12	2
		7	7	7.5	9	9.3	9.7	12	13	
		4	4	5.5	8	8.5	9	15	19	1
		4	4	5.5	8	8.5	9	17	19	

-2 - 1997 3 28 ( :mm)

	( :R)							
	<sup>98</sup> 4 30	5 30	6 30	7 30	8 20	9 30	10 30	
	14	17	20	22	23	25	26	2
	14	18	20	23	25	28	29	
	12	16	19	20	21	23	24	2
	13	17	21	22	23	25	27	
	8	9	10	11	12	14	15	2
	8	10	11	12	13	15	17	
	24.5	25	26	26.5	27	28	29	2
	27	28	30	31	32	34	35	
	26.3	26.5	27	27.5	28	29	30	2
	29.5	30	33	34	35	37	39	
	25.5	26	26.5	26.7	27	28	29	2
	29	30	31	31.5	32	34	37	
	12	14	16	17	18	20	22	2
	13	16	18	19	20	22	25	
	11.5	14	18	19	20	22	23	3
	12	16	20	21	22	24	27	
	13	15	18	19	20	22	24	3
	14	17	21	22	23	26	28	
	17	20	23	24	25	27	28	2
	21	25	30	31	32	35	37	



1) 1 (1997 )

가) Vinyl house 200 15 2,000

4 2 3℃

「12」 가

前期 5-6 가

) 後期

가

) 30 4 ( , , )

3 5 30

가

) 20

「 」 「 」 「 」



( 44)



( 45) 1



( 46) 1



< 12>

Vinyl house

-1 - 1997 3 20 ( : mm)

		( : R)								
		3 20	4 30	5 31	6 30	7 31	8 20	9 30	10 25	
		5	5	6	8	8.5	9	13	14	1
		5	5	5.5	6	6.5	7	10	12	
		3.7	5	6.2	8	8.5	9	12	13	1
		5.5	4	5	6.5	6.7	7	9	11	
		5.5	5.8	5.9	6.5	6.8	7	8	9	1
		5.5	5.5	5.6	5.7	5.8	6	7	7.5	
		15	16	18	21	22	23	26	27	1
		15	15	17	20	21	22	25	26	
(2 )		21	21	24	25	26	27	30	31	2
		21	21	22	23	24	25	29	30	
		18	18	20	23	24	25	28	29	1
		18	18	20	21	22	23	27	28	
		5	5.2	6.5	8.5	9	10	13	14	1
		5	5.1	5.6	6.7	7	7.5	11	12	
		6	6.2	6.7	7.2	7.5	8	11	14	2
		6	6.1	6.5	6.8	7	7	10	12	
		18	19	21	23	24	26	29	30	1
		18	18	20	22	23	24	28	29	
		4	5	7	9	10	11	18	20	1
		4	4	5.6	8	8.5	9	17	19	
		8	8.5	10	12	13	14	19	20	2
		8	8	9	10	11	12	18	19	
		6	6.2	6.5	7.5	7.7	8	9	9.3	1
		6	6	6.2	6.5	6.8	7	9	9.2	
		20	21	23	27	30	32	37	38	2
		20	20	21	24	26	27	34	35	
		7	7	7.5	8	8.2	8.5	12	13	2
		7	7	7.5	9	9.3	9.7	12	13	
		9	9	9.2	9.5	9.8	10	12	13	1
		9	9	9.2	10	10.5	11	13	14	

2) 2 (1998 )

가) 15 97 3 28

「 13 」

根上 ,

가 가

) 30 가 Huse Vinyl 5

stress

10 Vinyl

) (R) 20 Sampling

「 」 「 」 「 」 「 」



( 47)

2



( 48)

2



( 49)



( 50)



( 51)





( 52) 가  
가



( 53)

< 13>

Vinyl house

-2 - 1997 3 20 ( : mm)

		( : R)							
		4 <sup>98</sup> 30	5 30	6 30	7 30	8 20	9 30	10 25	
		16	21	25	27	28	32	35	2
		14	18	22	23	25	28	30	
		16	19	23	24	25	28	30	2
		13	17	21	22	23	25	26	
		10	12	13	14	15	17	18	2
		8	10	11	12	13	15	16	
		29	30	33	34	35	38	39	2
		27	28	30	31	32	34	35	
(2 )		33	36	28	39	40	43	45	3
		32	33	34	35	36	39	40	
		30	32	33	34	35	38	40	2
		29	30	31	31.5	32	35	36	
		17	20	22	23	24	27	28	2
		13	16	18	19	20	22	23	
		15	20	26	28	30	34	36	3
		12	16	20	21	22	26	28	
		32	35	37	38	40	43	45	2
		29.5	30	33	34	35	37	39	
		23	29	35	38	40	43	45	2
		21	25	30	31	32	35	37	
		23	25	28	30	32	35	37	3
		20	23	27	29	30	33	34	
		11	13	14	14.5	15	18	20	2
		9.5	10	11.5	11.7	12	14	16	
		40	42	44	46	48	50	53	3
		37	39	41	43	45	48	50	
		15	18	22	24	25	28	29	3
		14	17	21	22	23	25	26	
		14	15	17	18	19	22	23	2
		15	16	18	19	20	22	23	

3.

가.

1)

< 14 >

	Vinyl house	
	· ·	· 2 ·
	· , , · 가 .	· 凍害 가 ·
	· ) ( ) · · 가 가 .	· · 가 . ( 가 가 )
	· , 20% 가 .	· , 「 」 「 」 .

1) Vinyl house

< 15>

	<p>가 ( , , )</p>	<p>가</p>
	<p>가</p>	<p>.</p>
	<p>2 가 가 5-20%</p>	<p>·2 5-20%</p>
	<p>가 가 가</p>	<p>가 가</p>



## 4

1. (1997), .
2. 12 (1997), , .
3. 5 (1998), , .
4. (1993), , .
5. (1995), .
6. (1981), , .
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