



BOOMTEELT PRAKTIJKONDERZOEK

PROEFSTATION VOOR DE BOOMKWEKERIJ
RESEARCH STATION FOR NURSERY STOCK

Commissioned by:

**Fytogreen BV
Ambachtsweg 6
6657 CK Boven-Leeuwen
The Netherlands**

**Project: 1333 Research on the usage of FYTOCELL
as a soil improving material.**

December 1999

Carried out by:

**Research Station for Nursery Stock
Contact person: Ing Th.G.L. Aendekerk
Post Box 118
2770 AC Boskoop
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1.4 Measurements

1. Texture and chemical composition of the soil was analysed;
2. 'Ring' samples were taken in week 20, 32 and 44 in 1999 and in week 26 and 42 in 2000 for physical research;
3. The compressive strength was measured with the 'penetrograph' in week 20 and 44 in 1999 and in week 42 in 2000;
4. Crop observation was carried out at the beginning of the cultivation in week 20, week 32 and week 44 in 1999 and in week 42 in 2000.

Table of Contents

| | |
|---|----|
| TABLE OF CONTENTS | I |
| SUMMARY | II |
| 1. INTRODUCTION | 1 |
| 1.1 THE PRODUCT FYTOCELL | |
| 1.2 PURPOSE OF THE RESEARCH | 1 |
| 1.3 EXECUTION OF THE RESEARCH | 1 |
| 1.4 MEASUREMENTS | 2 |
| 2. RESULTS | |
| 2.1 PHYSICAL AND CHEMICAL ANALYSIS | 3 |
| 2.2 PHYSICAL MEASUREMENTS | 3 |
| 2.3 COMPRESSIVE STRENGTH OF THE SOIL | 4 |
| 2.4 CROP OBSERVATION | 4 |
| 3. CONCLUSIONS | 6 |
| APPENDIX | |
| 1a. RESULTS OF THE 'NITROGEN-PLUS' RESEARCH | |
| 1b. RESULTS OF THE TEXTURE RESEARCH | |
| 1c. RESULTS OF THE CHEMICAL RESEARCH | |
| 1d. COMPRESSIVE STRENGTH OR RESISTANCE MEASUREMENTS IN N/CM ² , 1999 | |
| 1e. COMPRESSIVE STRENGTH OR RESISTANCE MEASUREMENTS IN N/CM ² , 2000 | |
| 2a. RING SAMPLE ANALYSIS WEEK 20, 1999 | |
| 2b. RING SAMPLE ANALYSIS WEEK 32, 1999 | |
| 2c. RING SAMPLE ANALYSIS WEEK 44, 1999 | |
| 2d. RING SAMPLE ANALYSIS WEEK 42, 2000 | |
| 2e. PHYSICAL RESEARCH ON FYTOCELL AS A SOIL IMPROVING MATERIAL | |
| 3a1. FYTOCELL AS A SOIL IMPROVING MATERIAL, PLANT LENGTH, WEEK 20 '99 | |
| 3a2. FYTOCELL AS A SOIL IMPROVING MATERIAL, PLANT LENGTH, WEEK 32 '99 | |
| 3a3. FYTOCELL AS A SOIL IMPROVING MATERIAL, PLANT LENGTH, WEEK 44 '99 | |
| 3a4. FYTOCELL AS A SOIL IMPROVING MATERIAL, PLANT LENGTH, WEEK 42 '00 | |
| 3b. SOIL IMPROVEMENT IN SANDY SOIL, LENGTH OF NEW SHOOT, <i>PINUS</i> 1999 | |
| 3c. SOIL IMPROVEMENT WITH FYTOCELL, FRESH & DRY WEIGHT <i>AMELANCHIER</i> | |
| 3d. RESEARCH ON FYTOCELL, LENGTH OF <i>PINUS</i> IN 2000 | |

Summary

In 1999 and 2000 Fytogreen commissioned research to be carried out with the product Fytocell. The requirements of products such as peat soil matter and other organic products are formulated by the 'Soil Supplement Regulations' (RAG) and by the 'Potting Soil Trade Regulation' (RHP). New products for which there are no product requirements available, must be investigated. Depending on the area of application, extra requirements maybe necessary. Positive effects are expected with the application of Fytocell as a soil improving material in mineral soil or in potting soil.

Fytocell was mixed with sandy soil at the Boot & Co. Research Station for Nursery Stock, Zundert. During the fertilization research it was determined that due to the application of Fytocell the availability of nutrients increased.

This is clearly measurable in the first year of mixing and in the second year there is a marginal effect. The availability of nitrogen and potassium was higher especially in the first year of application. In the second year there was a marginal effect measurable. There was an extra 7 kg mineral N per ha present in the soil per 10 vol. % Fytocell.

There was no influence to the pH level in this strongly buffered soil.

The compressive strength or resistance of the soil decreases due to the use of Fytocell.

An increase is evident in vol. % moisture of approximately 8% per 10 vol. % Fytocell.

The moist and dry bulk weight decrease with respectively 4 and 6-weight % per 10 vol. % Fytocell.

The *Amelanchier* plants were longer and the fresh and dry weight was higher. The root quality received a higher rating due to the use of Fytocell.

At the end of the second growing year, the plants with a dosage of 12.5 and 25 vol. % Fytocell received a higher quality valuation when compared to the control. An optimum was already achieved with a dose of 12.5 %.

A control on the *Pinus* crop was not carried out at the beginning of the trial; therefore it is not possible to make a comparison. The higher dosage of Fytocell in the last year gave measurable shorter plants and a shorter shoot growth. The plants root development was excellent.

1. Introduction

1.1 The Product Fytozell

In 1999 and 2000 Fytogreen commissioned research to commence with the product Fytozell. The aim of this research is to establish the user value or application possibilities of Fytozell both in mineral soil and in potting soil.

The requirements of products such as peat soil matter and other organic products are formulated by the 'Soil Supplement Regulation' (RAG) and by the 'Potting Soil Trade Regulations' (RHP). Standardization in product requirements is adapted for the connected companies, which fall under the control of this regulation.

New products for which there are no product requirements available, must be investigated. Depending on the area of application, extra requirements maybe necessary which have not yet been carried out in this standardized control system.

Positive effects are expected with the application of Fytozell as a soil improver in mineral soil or in potting soil.

Listed below are some of the qualities resulting from the use of the material:

- Increase in soil pore volume
- Increase/Decrease of soils moisture capacity
- Increase in buffer capacity and mineral capacity of the soil
- Increase in soil aeration

Products such as Fytozell have rarely been used for crops grown outside and in open space planning. Therefore it is necessary to carry out basic research.

1.2 Purpose of the research

To establish the changes in physical properties in the improved sandy soil as a result of the addition of Fytozell flakes, which were incorporated as an overall treatment. Which soil parameters are interesting and what are the achieved effects?

1.3 Execution of the research

To improve the cultivated soil, Fytozell was used with a sieve fraction of 2-15 mm.

Fytozell was applied to two mixture proportions to a depth of 30 cm, using sandy soil as cultivated soil. The trial location was at the Boot & Co. Nursery, Zundert. The area for each treatment was 250 m².

The following treatments were handled in the trial:

1. Untreated (control).
2. 12.5 volume % Fytozell flakes, with a layer thickness of 3.75 cm.
3. 25 volume % Fytozell flakes, with a layer thickness of 7.5 cm.

The ground was ploughed twice to a depth of 30 cm in order to achieve a thorough mixture. The crops *Amelanchier lamarckii* and *Pinus nigra ssp. Nigra* were used in the trial. These plants are delivered with root after 2 or more growing seasons. The plant distance was 70 x 70 cm. The application of the trial was carried out by Boot & Co. Nursery on a dry sensitive field. The planting date was the end of April 1999 and the plants will remain in the field until at least November 2000.

The physical properties of the soil were established. The Research Station for Nursery Stock carried out the soil measurements and the crop observation.

2. Results

2.1 Physical and chemical analysis

The results of the N-mineral, texture and fertilization research are detailed in appendix 1a and 1b. There is a slight increase noticed in the amount of nitrogen and potassium due to the addition of Fytozell. The level of nitrogen and potassium in the control carried out in 1999 was already very high. Additional fertilization in 1999 was not necessary. The pH level of the strongly buffered soil hardly changed due to the addition of Fytozell. The percentage of fine particles < 50 ppm remained the same by using Fytozell.

It was established in the fertilization research that the availability of nutrient elements increased by using Fytozell.

In the first year of mixing it is clearly measurable and in the second year the effect is marginal. The nitrogen mineral rating in the soil was measured on May 4, 2000. The amounts measured in the soil with Fytozell was respectively 10 and 16 kg N per ha higher than the control. The actual fertilization dosage was: Boot 1. 49 kg N, for Boot 2. with 12.5% Fytozell, 39 kg and Boot 3 with 25% Fytozell, 33 Kg N per ha.

The percentage of organic matter content increased by approximately 1 % due to the addition of Fytozell.

2.2 Physical measurements

The basic details of the volume % moisture, the bulk weight and the dry bulk weight are illustrated in appendix 2a – 2 e. The average figures calculated are shown in Table 1 – 5.

Table 1 Moisture Volume % in the cultivated soil at Boot & Co. in 1999

| Treatment | Week 20 | Week 32 | Week 44 | Week 44 |
|-----------|---------|---------|---------|---------|
| Boot 1 | 26.1 | 20.1 | 23.4 | 100% |
| Boot 2 | 31.2 | 22.7 | 27.1 | 116% |
| Boot 3 | 31.2 | 29.3 | 29.0 | 124% |

By applying Fytozell there is an increased availability of moisture.

Table 2 Moisture Volume % in the cultivated soil at Boot & Co. in 2000

| Treatment | Week 26 | Week 42 | Week 26 | Week 42 |
|-----------|---------|---------|---------|---------|
| Boot 1 | 11.72 | 16.7 | 100% | 100% |
| Boot 2 | 15.45 | 18.5 | 132% | 111% |
| Boot 3 | 15.67 | 24.6 | 134% | 147% |

By applying Fytozell there is an increased availability of moisture.

Table 3 Moisture bulk weight in g/cm³ in the soil at Boot & Co. in 1999

| Treatment | Week 20 | Week 32 | Week 44 | Week 44 |
|-----------|---------|---------|---------|---------|
| Boot 1 | 1.68 | 1.55 | 1.65 | 100% |
| Boot 2 | 1.54 | 1.49 | 1.49 | 90% |
| Boot 3 | 1.51 | 1.47 | 1.45 | 88% |

By applying Fytozell the moisture bulk weight decreases.

Table 4 Dry bulk weight in g/cm³ in the soil at Boot & Co. in 1999

| Treatment | Week 20 | Week 32 | Week 44 | Week 44 |
|-----------|---------|---------|---------|---------|
| Boot 1 | 1.42 | 1.35 | 1.42 | 100% |
| Boot 2 | 1.22 | 1.24 | 1.22 | 86% |
| Boot 3 | 1.20 | 1.19 | 1.16 | 82% |

By applying Fytozell the dry bulk weight decreases.

1.4 Measurements

1. Texture and chemical composition of the soil was analysed;
2. 'Ring' samples were taken in week 20, 32 and 44 in 1999 and in week 26 and 42 in 2000 for physical research;
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| | |
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By applying Fyocell the dry bulk weight decreases.

Bijlage 1 e Draagkracht of weerstandsmetingen in N/cm² in 2000

| diepte in cm | Boot 1 week 42 | Boot 2 week 42 | Boot 3 week 42 |
|-----------------|-------------------|-------------------|-------------------|
| 0 | 20 | 10 | 10 |
| 5 | 105 | 100 | 95 |
| 10 | 140 | 115 | 105 |
| 15 | 165 | 145 | 125 |
| 20 | 205 | 190 | 165 |
| 25 | 245 | 210 | 180 |
| 30 | 285 | 245 | 240 |
| 35 | 300 | 270 | 290 |
| 40 | 330 | 350 | 340 |
| 45 | 375 | 375 | 370 |
| 50 | 410 | 390 | 380 |
| 55 | 400 | 410 | 400 |
| 60 | 390 | 420 | 425 |
| 65 | 400 | 410 | 415 |
| 70 | 450 | 430 | 420 |
| 75 | 450 | 430 | 430 |
| 80 | 450 | 430 | 430 |

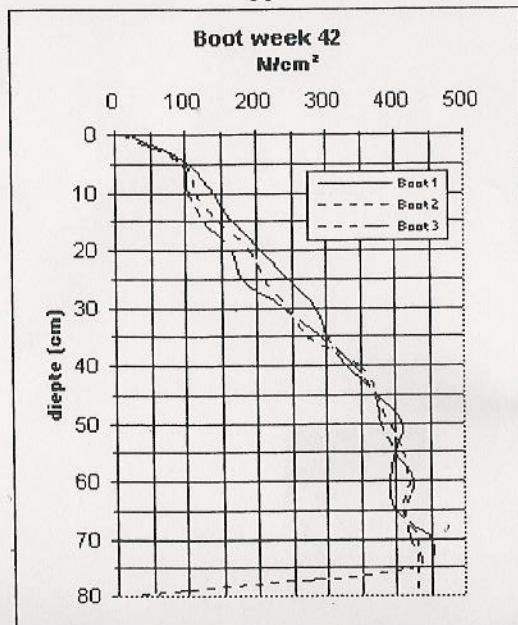


Table 5 Moist and dry bulk weight in g/cm³ in the soil in 2000

| Treatment | Moisture | | Dry | |
|-----------|----------|---------|---------|---------|
| | Week 26 | Week 42 | Week 26 | Week 42 |
| Boot 1 | 149.8 | 1.58 | 132.26 | 1.32 |
| Boot 2 | 140.44 | 1.43 | 118.78 | 1.17 |
| Boot 3 | 141.68 | 1.54 | 119.5 | 1.14 |

By applying Fytozell the dry bulk weight decreases.

2.3 Compressive strength of the soil

The compressive strength or resistance measurements concerning the Fytozell, with the crop Amelanchier at Boot & Co. are mentioned in appendix 1d and 1e.

In week 20, 1999, three weeks after planting, there was a lowered resistance measured in the soil with Fytozell, compared to the soil with no Fytozell. The greatest difference occurs with 25% volume % Fytozell. The soil has more resistance in week 44 of 1999, than in week 20. In week 42 of 2000 the resistance in the soil is somewhat higher than in the previous year. Depending on the depth of the soil profile to 10 – 35 N/ cm², soil with Fytozell shows lower resistance compared to soil without Fytozell.

When a comparison is made with the limit values for the rooting of Nursery crops in general, all of the measured resistances are sufficiently low in the profile to a depth of approximately 50 cm. By adding Fytozell, the obvious lower resistance in the root zone can have a positive effect, because this limit value for sensitive crops for the bulk density of the soil are roughly estimated.

2.4 Crop observation

The crop observation at Boot & Co. of the soil objects treated with Fytozell is recorded in appendix 3a – 3d.

The lengths of the Amelanchier plants during the growing season are mentioned in table 6.

Table 6 The length of the Amelanchier in cm in the soil with Fytozell in 1999

| Treatment | Week 20 | Week 34 | Week 44 | Week 44 |
|---------------|---------|---------|---------|---------|
| Boot1-control | 39.5 | 64.5 | 63.4 | 100% |
| Boot2 -12.5% | 50.1 | 114.2 | 113.4 | 179% |
| Boot3-25% | 54.4 | 115.0 | 114.1 | 180% |

By applying Fytozell the length of the plants increased in 1999.

Table 7 The length of the Amelanchier in cm in the soil with Fytozell in 2000

| Treatment | Week 42 | Week 44 | Grading size | |
|---------------|---------|---------|--------------|-----|
| Boot1-control | 106.5 | 100% | 80-100 cm | 85% |
| | | | 100-125 cm | 15% |
| Boot2 -12.5% | 149.3 | 140% | 100-125 cm | 7% |
| | | | 125-150 cm | 93% |
| Boot3-25% | 150.4 | 141% | 100-125 cm | 5% |
| | | | 125-150 cm | 95% |

By applying Fytozell the length of the plants increased. A higher % of the plants were in the higher grading size.

Table 8 Fresh and dry weight – Amelanchier in the field soil.
With and without Fytozell, Boot & Co., 1999

| Treatment | Week 44 Fresh in g | Week 44 Fresh in % | Week 44 Dry in g | Week 44 Dry in % |
|---------------|-----------------------|-----------------------|---------------------|---------------------|
| Boot1-control | 54.3 | 100% | 31.2 | 100% |
| Boot2 -12.5% | 126.9 | 184% | 69.6 | 223% |
| Boot3-25% | 183.5 | 338% | 99.0 | 317% |

By adding Fytozell the fresh and dry weight increased.

Table 9 Fresh and dry weight – Amelanchier in the field soil.
With and without Fytozell, Boot & Co., 2000

| Treatment | Week 42 Fresh in g | Week 42 Fresh in % | Week 42 Dry in g | Week 42 Dry in % |
|---------------|-----------------------|-----------------------|---------------------|---------------------|
| Boot1-control | 700 | 100% | 417 | 100% |
| Boot2 -12.5% | 1745.5 | 249% | 1168 | 280% |
| Boot3-25% | 1819 | 260% | 1262 | 302% |

By adding Fytozell the fresh and dry weight of the plants increased. With the application of the highest vol. % Fytozell there was a slight increase noticeable.

The total length of *Pinus* crop plants were measured and the length of 5 shoots that grew in the year that the measuring took place. The results are shown in table 10 and 11.

Table 10 Growth in length in cm – *Pinus* in soil with Fytozell at Boot in 1999.

| Treatment | Week 44 Total Plant | Week 44 Total Plant | Week 44 Young Shoot | Week 44 Young Shoot |
|---------------|------------------------|------------------------|------------------------|------------------------|
| Boot1-control | * | * | * | * |
| Boot2 -12.5% | 82.1 cm | 100% | 15.6 cm | 100% |
| Boot3-25% | 82.2 cm | 100.2% | 17.05 cm | 109% |

*There was no control treatment present.

An even growth was determined with a mixture of 12.5 and 25 vol. % Fytozell in the soil.

Table 11 Growth in length in cm – *Pinus* in soil with Fytozell at Boot in 2000.

| Treatment | Week 44 Total Plant | Week 44 Total Plant | Week 44 Young Shoot | Week 44 Young Shoot |
|---------------|------------------------|------------------------|------------------------|------------------------|
| Boot1-control | * | * | * | * |
| Boot2 -12.5% | 115 cm | 100% | 29.7 cm | 100% |
| Boot3-25% | 106 cm | 92.2% | 24.7 cm | 83.2% |

*There was no control treatment present.

A decrease in the length and shoot growth was measured with the application of the highest Fytozell dosage.

3. Conclusions

It was determined/established in the fertilization research that the availability of nutrients increased due to the addition of Fytozell.

In the first year of mixing the results are clearly measurable and in the second year there is a slighter effect. The amount of organic particles present increased by 1%.

An increase was recorded in moisture volume % of approximately 8% per 10-volume % Fytozell. The moist and dry bulk weight decreased with respectively 4% and 6% per 10-volume % Fytozell.

The compressive strength or resistance of the soil decreases in the layer with Fytozell incorporated. The *Amelanchier* plants were longer and the fresh and dry weight was higher.

The root quality received a higher rating when Fytozell was applied.

At the end of the second growing year, the plants with an addition of 12.5% and 25 vol. % Fytozell received a higher quality valuation when compared to the control. An optimum was already achieved with a dose of 12.5 %.

A control on the *Pinus* crop was not carried out at the beginning of the trial. Therefore, it was not possible to make a comparison with the control. The higher –percentage of Fytozell in the last year gave measurable shorter plants and a shorter shoot growth. The plants root development was excellent.

Bijlage 1 Analyseresultaten

Bijlage 1a Resultaten van het 'Stikstof-plus'-onderzoek

Analysemethode: veldvochtige grond, volgens 1:2 v/v CaCl₂

| Datum | behandeling | mg per liter extract | | | Beschikbare voorraad (kg/ha) | |
|-----------|-------------|-------------------------|--------------------|---|------------------------------|------------------|
| | | NH ₄ -N | NO ₃ -N | K | N | K ₂ O |
| 27-5-1999 | boot 1 | < 0,5 | 12,3 | 213 | 74 | 1540 |
| 27-5-1999 | boot 2 | 1 | 17,9 | 237 | 113 | 1714 |
| 27-5-1999 | boot 3 | 5,9 | 11 | 209 | 101 | 1511 |
| 4-5-2000 | boot 1 | < 0,5 | 3,5 | 74,2 | 21 | 536 |
| 4-5-2000 | boot 2 | < 0,5 | 5,1 | 69,7 | 31 | 504 |
| 4-5-2000 | boot 3 | 1 | 5,2 | 81,4 | 37 | 589 |
| 30-6-2000 | boot 1 | < 0,5 | 8,1 | 87,9 | 49 | 636 |
| 30-6-2000 | boot 2 | < 0,5 | 8,5 | 87,9 | 51 | 636 |
| 30-6-2000 | boot 3 | < 0,5 | 7,9 | 111,1 | 47 | 803 |
| | | Kg N per ha in de bodem | | Gift in kg per ha Kg kalk ammonalpeter per ha | | |
| 4-5-2000 | boot 1 | 21 | | 49 | 180 | |
| 4-5-2000 | boot 2 | 31 | | 39 | 145 | |
| 4-5-2000 | boot 3 | 37 | | 33 | 125 | |

Bijlage 1b Resultaten van het granulair onderzoek

d.d. 27-5-1999

| Analyse | Behandeling | | |
|--------------------------------|-------------|-------|-------|
| | boot1 | boot2 | boot3 |
| pH-KCl | 7 | 7 | 6,5 |
| Vocht ¹ | 0,82 | 1,17 | 0,73 |
| Organische stof ² | 3,1 | 4,9 | 3,7 |
| CaCO ₃ ² | 0 | 0 | 0 |
| Afslibbaar ² | 4,4 | 4,2 | 3,8 |
| Totaal zand ² | 92,5 | 90,9 | 92,5 |
| Granulair ³ | | | |
| 0-2 µm | 3 | 3,1 | 2,7 |
| 2-16 µm | 1,6 | 1,3 | 1,2 |
| 16-50 µm | 7,8 | 7,6 | 9 |
| 50-105 µm | 18,9 | 19,1 | 18 |
| 105-150 µm | 24 | 24 | 23,3 |
| 150-210 µm | 25,1 | 24,7 | 25,5 |
| 210-300 µm | 14,2 | 13,7 | 13,9 |
| 300-2000 µm | 5,4 | 6,5 | 6,4 |

¹ gram / 100 gram luchtdroog

² gram / 100 gram droge stof

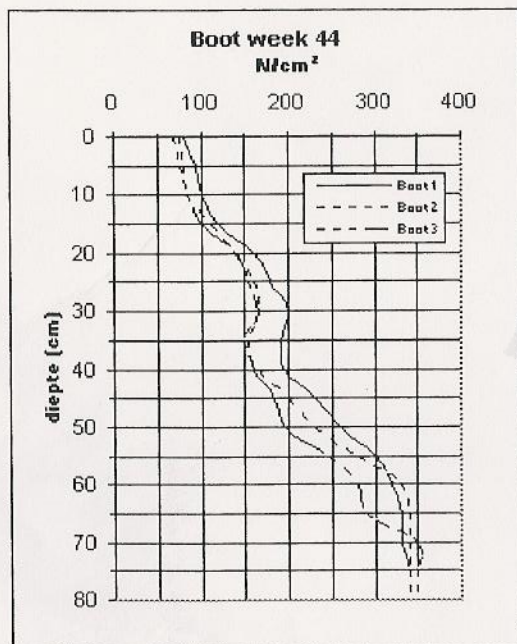
³ % van de minerale delen

Bijlage 1c Resultaten van het chemisch onderzoek

| | | pH-KCl | Org. Stof | Fosfaat | | Kali |
|-----------|--------|--------|-----------|---------|------|------|
| | | | | P-w | P-AL | K-HC |
| 27-5-1999 | boot 1 | 6,1 | 3,4 | 70 | 66 | 62 |
| 27-5-1999 | boot 2 | 6,7 | 4,9 | 95 | 103 | 77 |
| 27-5-1999 | boot 3 | 6,4 | 4,2 | 104 | 87 | 69 |
| 4-5-2000 | boot 1 | 6,5 | 3,2 | 66 | 80 | 30 |
| 4-5-2000 | boot 2 | 6,7 | 4,8 | 76 | 106 | 37 |
| 4-5-2000 | boot 3 | 6,8 | 4,6 | 77 | 116 | 33 |

Bijlage 1d Draagkracht of weerstandsmetingen in N/cm² in 1999

| diepte in cm | Boot 1 | Boot 2 | Boot 3 | Boot 1 | Boot 2 | Boot 3 |
|-----------------|---------|---------|---------|---------|---------|---------|
| | week 20 | week 20 | week 20 | week 44 | week 44 | week 44 |
| 0 | 70 | 65 | 50 | 80 | 75 | 70 |
| 5 | 90 | 70 | 65 | 95 | 80 | 75 |
| 10 | 100 | 90 | 75 | 100 | 85 | 85 |
| 15 | 120 | 110 | 105 | 120 | 110 | 100 |
| 20 | 155 | 140 | 120 | 160 | 140 | 140 |
| 25 | 190 | 160 | 140 | 180 | 160 | 155 |
| 30 | 195 | 160 | 155 | 200 | 165 | 165 |
| 35 | 190 | 155 | 150 | 190 | 150 | 155 |
| 40 | 180 | 150 | 165 | 195 | 165 | 160 |
| 45 | 170 | 170 | 175 | 230 | 200 | 185 |
| 50 | 200 | 185 | 160 | 260 | 230 | 195 |
| 55 | 230 | 200 | 185 | 300 | 280 | 245 |
| 60 | 250 | 250 | 240 | 320 | 330 | 280 |
| 65 | 290 | 310 | 270 | 330 | 340 | 290 |
| 70 | 340 | 330 | 350 | 330 | 340 | 350 |
| 75 | 350 | 340 | 345 | 340 | 340 | 350 |
| 80 | 350 | 340 | 345 | 340 | 340 | 350 |



Bijlage 2a Analyse ringmonsters week 20, 1999

| Monsternr. | ringnr. | massa ring | massa plastic zak | massa ring + plastic + vochtige grond | massa ring + droge grond | Vochtige grond (g/100 cm ³) | Droge grond (g/100 cm ³) | Volume% vocht | Volume% vocht gemidd. | Bulkgewicht vochtig (g/cm ³) | Bulkgewicht droog (g/cm ³) |
|------------|---------|------------|-------------------|---------------------------------------|--------------------------|---|--------------------------------------|---------------|-----------------------|--|--|
| 1a1 | 23 | 90,41 | 3,15 | 271,53 | 242,64 | 177,97 | 152,23 | 25,74 | | | |
| 1a2 | 22 | 90,69 | 3,15 | 259,7 | 232,44 | 165,86 | 141,75 | 24,11 | | | |
| 1a3 | 6 | 90,57 | 3,15 | 258,63 | 226,98 | 164,91 | 136,41 | 28,5 | | | |
| 1a4 | 14 | 90,63 | 3,15 | 258,36 | 228,98 | 164,58 | 138,35 | 26,23 | | | |
| 1a5 | 44 | 90,43 | 3,15 | 259,83 | 230,65 | 166,25 | 140,22 | 26,03 | 26,1 | 1,68 | 1,42 |
| 2a1 | 31 | 90,32 | 3,15 | 255,9 | 221,83 | 162,43 | 131,51 | 30,92 | | | |
| 2a2 | 34 | 91,58 | 3,15 | 242,81 | 207,79 | 148,08 | 116,21 | 31,87 | | | |
| 2a3 | 29 | 90,97 | 3,15 | 238,64 | 200,62 | 144,52 | 109,65 | 34,87 | | | |
| 2a4 | 13 | 90,33 | 3,15 | 242,82 | 208,73 | 149,34 | 118,4 | 30,94 | | | |
| 2a5 | 18 | 91,32 | 3,15 | 258,15 | 227,44 | 163,68 | 136,12 | 27,56 | 31,2 | 1,54 | 1,22 |
| 3a1 | 11 | 90,6 | 3,15 | 250,21 | 217,63 | 156,46 | 127,03 | 29,43 | | | |
| 3a2 | 26 | 90,93 | 3,15 | 246,32 | 211,67 | 152,24 | 120,74 | 31,5 | | | |
| 3a3 | 33 | 91,13 | 3,15 | 244,67 | 208,61 | 150,39 | 117,48 | 32,91 | | | |
| 3a4 | 25 | 90,5 | 3,15 | 238,56 | 203,51 | 144,91 | 113,01 | 31,9 | | | |
| 3a5 | 40 | 91,49 | 3,15 | 246,73 | 213,23 | 152,09 | 121,74 | 30,35 | 31,2 | 1,51 | 1,20 |

NB: geen petrischaaltje gebruikt

Bijlage 15

Project 1333

Bodemverbetering van zandgrond

Lengte nieuwe schot van Pinus

Boot en Co

week 44 1999

Gemidd.

| plantnr. | 12,5% Fytocel | | | | | Scheutl.cm | 25% Fytocel | | | | | | | | |
|----------|---------------|----|----|----|----|------------|-------------|----|----|----|----|------------|-------|------------|--------|
| | 18 | 17 | 18 | 17 | 21 | | 17 | 19 | 19 | 18 | 19 | | | | |
| 1 | 18 | 17 | 18 | 17 | 21 | 18,2 | 17 | 19 | 19 | 18 | 19 | 18,4 | | | |
| 2 | 21 | 19 | 20 | 21 | 17 | 19,6 | 17 | 22 | 22 | 20 | 19 | 20 | | | |
| 3 | 16 | 16 | 16 | 17 | 14 | 15,8 | 17 | 18 | 18 | 17 | 19 | 17,8 | | | |
| 4 | 17 | 16 | 16 | 17 | 14 | 16 | 17 | 14 | 15 | 21 | 18 | 17 | | | |
| 5 | 16 | 16 | 17 | 12 | 16 | 15,4 | 17 | 22 | 22 | 19 | 19 | 19,8 | | | |
| 6 | 10 | 12 | 11 | 13 | 11 | 11,4 | 17 | 18 | 17 | 17 | 17 | 17,2 | | | |
| 7 | 12 | 14 | 14 | 14 | 12 | 13,2 | 17 | 18 | 17 | 17 | 17 | 17,2 | | | |
| 8 | 17 | 15 | 13 | 14 | 14 | 14,6 | 17 | 19 | 17 | 18 | 19 | 18 | | | |
| 9 | 15 | 16 | 16 | 18 | 14 | 15,8 | 17 | 15 | 17 | 16 | 17 | 16,4 | | | |
| 10 | 16 | 16 | 16 | 17 | 17 | 16,4 | 17 | 20 | 24 | 22 | 19 | 20,4 | | | |
| 11 | 12 | 13 | 12 | 13 | 13 | 12,6 | 17 | 14 | 17 | 18 | 18 | 16,8 | | | |
| 12 | 17 | 15 | 16 | 19 | 15 | 16,4 | 17 | 21 | 22 | 20 | 20 | 20 | | | |
| 13 | 16 | 14 | 13 | 18 | 15 | 15,2 | 17 | 15 | 13 | 13 | 13 | 14,2 | | | |
| 14 | 14 | 14 | 13 | 15 | 12 | 13,6 | 17 | 14 | 15 | 17 | 16 | 15,8 | | | |
| 15 | 17 | 13 | 14 | 17 | 17 | 15,6 | 17 | 15 | 17 | 16 | 15 | 16 | | | |
| 16 | 16 | 15 | 13 | 16 | 16 | 15,2 | 17 | 15 | 16 | 15 | 12 | 15 | | | |
| 17 | 13 | 10 | 11 | 11 | 12 | 11,4 | 0 | 0 | 0 | 0 | 0 | 0 kop stuk | | | |
| 18 | 14 | 13 | 15 | 16 | 15 | 14,6 | 17 | 17 | 19 | 20 | 19 | 18,4 | | | |
| 19 | 15 | 14 | 15 | 17 | 17 | 15,6 | 17 | 20 | 23 | 20 | 19 | 19,8 | | | |
| 20 | 17 | 16 | 15 | 18 | 18 | 16,8 | 17 | 19 | 18 | 17 | 18 | 17,8 | | | |
| 21 | 12 | 12 | 12 | 12 | 13 | 12,2 | 17 | 15 | 15 | 16 | 16 | 15,8 | | | |
| 22 | 14 | 15 | 14 | 15 | 15 | 14,6 | 17 | 14 | 13 | 14 | 15 | 14,6 | | | |
| 23 | 12 | 15 | 14 | 13 | 13 | 13,4 | 17 | 17 | 15 | 10 | 14 | 14,6 | | | |
| 24 | 14 | 16 | 15 | 12 | 16 | 14,6 | 17 | 15 | 16 | 18 | 18 | 16,8 | | | |
| 25 | 17 | 17 | 18 | 17 | 12 | 16,2 | 17 | 19 | 18 | 0 | 0 | 10,8 | | | |
| 26 | 21 | 25 | 24 | 24 | 23 | 23,4 | 17 | 16 | 15 | 17 | 17 | 16,4 | | | |
| 27 | 16 | 13 | 17 | 16 | 15 | 15,4 | 17 | 17 | 21 | 19 | 18 | 18,4 | | | |
| 28 | 17 | 18 | 17 | 18 | 18 | 17,6 | 17 | 14 | 14 | 15 | 11 | 14,2 | | | |
| 29 | 20 | 18 | 23 | 18 | 18 | 19,4 | 17 | 22 | 20 | 20 | 18 | 19,4 | | | |
| 30 | 18 | 16 | 15 | 16 | 17 | 16,4 | 17 | 16 | 19 | 20 | 15 | 17,4 | | | |
| | | | | | | 466,6 | | | | | | | 494,4 | | |
| | | | | | | Gem. | 15,55 | | | | | | | 29 planten | 17,048 |

Scheutlengte toename van 12,5 tot 25%Fyt

8,79%

)nderzoek aan FYTOCEL als bodemverbeterend materiaal

Bijlage 2b Analyse ringmonsters week 32, 1999

| Monsternr. | ringnr. | massa ring | massa plastic zak | massa ring + plastic + vochtige grond | massa ring + droge grond + petrischaal | massa petri-schaal | Vochtige grond (g/100 cm ³) | Droge grond (g/100 cm ³) | Volume% vocht | Volume% vocht gemidd. | Bulkgewicht vocht (g/cm ³) | Bulkgewicht droog (g/cm ³) |
|------------|---------|------------|-------------------|---------------------------------------|--|--------------------|---|--------------------------------------|---------------|-----------------------|--|--|
| 1a1 | 26 | 90,97 | 3,15 | 250,54 | 276,32 | 50,12 | 156,42 | 135,23 | 21,19 | | | |
| 1a2 | 42 | 90,36 | 3,15 | 246,43 | 270,19 | 45,73 | 152,92 | 134,1 | 18,82 | | | |
| 1a3 | 38 | 91,55 | 3,15 | 250 | 269,47 | 42,18 | 155,3 | 135,74 | 19,56 | | | |
| 1a4 | 37 | 91,62 | 3,15 | 255,1 | 281,43 | 49,13 | 160,33 | 140,68 | 19,65 | | | |
| 1a5 | 15 | 90,89 | 3,15 | 244,95 | 266,07 | 45,37 | 150,91 | 129,81 | 21,1 | 20,1 | 1,55 | 1,35 |
| 2a1 | 25 | 90,53 | 3,15 | 241,8 | 260,21 | 45,09 | 148,12 | 124,59 | 23,53 | | | |
| 2a2 | 17 | 90,51 | 3,15 | 240,83 | 269,96 | 54,95 | 147,17 | 124,5 | 22,67 | | | |
| 2a3 | 28 | 91,52 | 3,15 | 244,68 | 267,9 | 49,23 | 150,01 | 127,15 | 22,86 | | | |
| 2a4 | 33 | 91,19 | 3,15 | 246,77 | 273,95 | 52,29 | 152,43 | 130,47 | 21,96 | | | |
| 2a5 | 34 | 91,63 | 3,15 | 231,77 | 258 | 51,75 | 136,99 | 114,62 | 22,37 | 22,7 | 1,47 | 1,24 |
| 3a1 | 44 | 90,46 | 3,15 | 243,68 | 252,94 | 44,09 | 150,07 | 118,39 | 31,68 | | | |
| 3a2 | 6 | 90,57 | 3,15 | 241,94 | 254,67 | 44,04 | 148,22 | 120,06 | 28,16 | | | |
| 3a3 | 29 | 91 | 3,15 | 243,96 | 262,28 | 49,97 | 149,81 | 121,31 | 28,5 | | | |
| 3a4 | 33 | 91,19 | 3,15 | 240,94 | 253,55 | 45,31 | 146,6 | 117,05 | 29,55 | | | |
| 3a5 | 21 | 90,19 | 3,15 | 241,95 | 260,75 | 50,32 | 148,61 | 120,24 | 28,37 | 29,3 | 1,49 | 1,19 |

Bijlage 2c Analyse ringmonsters week 44, 1999

| Monsternr. | ringnr. | massa ring | massa plastic zak | massa ring + plastic + vochtige grond | massa ring + droge grond + petrischaal | massa petri-schaal | Vochtige grond (g/100 cm ³) | Droge grond (g/100 cm ³) | Volume% vocht | Volume% vocht gemid. | Bulkgewicht vocht (g/cm ³) | Bulkgewicht droog (g/cm ³) |
|------------|---------|------------|-------------------|---------------------------------------|--|--------------------|---|--------------------------------------|---------------|----------------------|--|--|
| 1a1 | 2 | 91,2 | 3,15 | 261,82 | 278,67 | 44,7 | 167,47 | 142,77 | 24,7 | | | |
| 1a2 | 6 | 90,57 | 3,15 | 267,4 | 283,15 | 41,02 | 173,68 | 151,56 | 22,12 | | | |
| 1a3 | 46 | 90,79 | 3,15 | 259,22 | 285,1 | 52,31 | 165,28 | 142 | 23,28 | | | |
| 1a4 | 30 | 90,98 | 3,15 | 252,92 | 275,86 | 49,52 | 158,79 | 135,36 | 23,43 | | | |
| 1a5 | 14 | 90,65 | 3,15 | 254,85 | 275,16 | 46,96 | 161,05 | 137,55 | 23,5 | 23,4 | 1,65 | 1,42 |
| 2a1 | 48 | 91,06 | 3,15 | 235,96 | 255,51 | 48,14 | 141,75 | 116,31 | 25,44 | | | |
| 2a2 | 45 | 90,85 | 3,15 | 248,26 | 264,82 | 46,01 | 154,26 | 127,96 | 26,3 | | | |
| 2a3 | 28 | 91,52 | 3,15 | 245,78 | 257,75 | 43,39 | 151,11 | 122,84 | 28,27 | | | |
| 2a4 | 27 | 91,24 | 3,15 | 244,24 | 261,25 | 48,8 | 149,85 | 121,21 | 28,64 | | | |
| 2a5 | 50 | 91,27 | 3,15 | 241,63 | 260,29 | 48,5 | 147,21 | 120,52 | 26,69 | 27,1 | 1,49 | 1,22 |
| 3a1 | 29 | 91 | 3,15 | 235,57 | 238,56 | 36,77 | 141,42 | 110,79 | 30,63 | | | |
| 3a2 | 20 | 90,38 | 3,15 | 244,57 | 258,19 | 45,75 | 151,04 | 122,06 | 28,98 | | | |
| 3a3 | 49 | 90,91 | 3,15 | 234,1 | 246,4 | 42,91 | 140,04 | 112,58 | 27,46 | | | |
| 3a4 | 47 | 91,8 | 3,15 | 247,9 | 264,14 | 48,83 | 152,95 | 123,51 | 29,44 | | | |
| 3a5 | 42 | 90,36 | 3,15 | 232,96 | 254,7 | 53,2 | 139,45 | 111,14 | 28,31 | 29,0 | 1,45 | 1,16 |

Bijlage 2d Analyse ringmonsters week 42, 2000

| Monsternr. | ringnr. | massa ring | massa ring + vochtige grond | massa petri-schaal | massa droge grond + petrischaal | ring + droge grond (g/100 cm ³) | Vochtige grond (g/100 cm ³) | Droge grond (g/100 cm ³) | Volume% vocht | Volume% vocht gemid. | Bulkgewicht vocht (g/cm ³) | Bulkgewicht droog (g/cm ³) |
|------------|---------|------------|-----------------------------|--------------------|---------------------------------|---|---|--------------------------------------|---------------|----------------------|--|--|
| 1a1 | 42 | 89,9 | 244,6 | 49,5 | 267,5 | 154,7 | 128,1 | 17,19 | | | | |
| 1a2 | 48 | 90,7 | 253,5 | 47,2 | 274,7 | 162,8 | 136,8 | 15,97 | | | | |
| 1a3 | 3 | 90,2 | 245 | 38,8 | 257,1 | 154,8 | 128,1 | 17,25 | | | | |
| 1a4 | 24 | 89,7 | 242,5 | 40,6 | 258,9 | 152,8 | 128,6 | 15,84 | | | | |
| 1a5 | 26 | 90,5 | 256 | 44,4 | 271,9 | 165,5 | 137 | 17,22 | 16,7 | 1,58 | 1,32 | |
| 2a1 | 11 | 90,3 | 228,3 | 48,5 | 250,8 | 138 | 112 | 18,84 | | | | |
| 2a2 | 13 | 90 | 245,3 | 50 | 267,9 | 155,3 | 127,9 | 17,64 | | | | |
| 2a3 | 22 | 90,3 | 234,3 | 44,9 | 250,3 | 144 | 115,1 | 20,07 | | | | |
| 2a4 | 9 | 89,9 | 225,8 | 45,8 | 245,3 | 135,9 | 109,6 | 19,35 | | | | |
| 2a5 | 36 | 91,6 | 234,2 | 47,1 | 257,8 | 142,6 | 119,1 | 16,48 | 18,5 | 1,43 | 1,17 | |
| 3a1 | 27 | 91 | 249,8 | 46,1 | 264,3 | 158,8 | 127,2 | 19,90 | | | | |
| 3a2 | 2 | 90,9 | 237,8 | 49,7 | 254,4 | 146,9 | 113,8 | 22,53 | | | | |
| 3a3 | 31 | 90,1 | 277,3 | 47,5 | 243 | 187,2 | 105,4 | 43,70 | | | | |
| 3a4 | 12 | 90,7 | 232,8 | 42,3 | 247,3 | 142,1 | 114,3 | 19,56 | | | | |
| 3a5 | 4 | 90,1 | 223,9 | 53,1 | 253,7 | 133,8 | 110,5 | 17,41 | 24,6 | 1,54 | 1,14 | |

Bijlage 2e

Project 1405 Onderzoek naar Fytozell als bodemverbeterend materiaal

Proeflocatie Boot en Co Zundert
Week 26 2000

| Monsternr. | ringnr. | massa ring | massa ring + vochtige grond | massa petri-schaal | massa ring + droge grond + petrischaal | Vochtige grond (g/100 cm ³) | Droge grond (g/100 cm ³) | Volume% vocht | Volume% vocht gemidd. | Bulkgw. vochtig g/cm ³ | Bulk gew. Droog g/cm ³ |
|------------|---------|------------|-----------------------------|--------------------|--|---|--------------------------------------|---------------|-----------------------|-----------------------------------|-----------------------------------|
| 1a1 | 22 | 90,7 | 246,6 | 65,6 | 295,6 | 155,9 | 139,3 | 10,65 | | | |
| 1a2 | 17 | 90,4 | 250,6 | 64,4 | 296 | 160,2 | 141,2 | 11,86 | | | |
| 1a3 | 9 | 90,2 | 236 | 65,2 | 282,7 | 145,8 | 127,3 | 12,69 | | | |
| 1a4 | 4 | 90,1 | 232,7 | 39,1 | 254,7 | 142,6 | 125,5 | 11,99 | | | |
| 1a5 | 21 | 90,1 | 234,6 | 65,5 | 283,6 | 144,5 | 128 | 11,42 | 11,72 | 149,8 | 132,26 |
| 2a1 | 42 | 90,3 | 226,2 | 45,9 | 250,8 | 135,9 | 114,6 | 15,67 | | | |
| 2a2 | 13 | 90,3 | 227,6 | 37,2 | 241,7 | 137,3 | 114,2 | 16,82 | | | |
| 2a3 | 31 | 90,3 | 243,1 | 46,8 | 268 | 152,8 | 130,9 | 14,33 | | | |
| 2a4 | 27 | 91,2 | 227 | 49,4 | 255,3 | 135,8 | 114,7 | 15,54 | | | |
| 2a5 | 36 | 91,7 | 232,1 | 49,2 | 260,4 | 140,4 | 119,5 | 14,89 | 15,45 | 140,44 | 118,78 |
| 3a1 | 48 | 91 | 223,3 | 44,1 | 245,4 | 132,3 | 110,3 | 16,63 | | | |
| 3a2 | 38 | 91,5 | 246,7 | 36,4 | 258,2 | 155,2 | 130,3 | 16,04 | | | |
| 3a3 | 11 | 90,6 | 233,3 | 64,5 | 277,1 | 142,7 | 122 | 14,51 | | | |
| 3a4 | 7 | 91 | 227,3 | 57,2 | 261,7 | 136,3 | 113,5 | 16,73 | | | |
| 3a5 | 2 | 91,2 | 233,1 | 65,6 | 278,2 | 141,9 | 121,4 | 14,45 | 15,67 | 141,68 | 119,5 |

Bijlage 2e**Project 1405 Onderzoek naar Fytozell als bodemverbeterend materiaal**

Proeflocatie Boot en Co Zundert

Week 42 2000

| Monsternr. | ringnr. | massa ring | massa ring + vochtige grond | massa petri-schaal | massa ring + droge grond + petrischaal | Vochtige grond (g/100 cm ³) | Droge grond (g/100 cm ³) | Volume% vocht | Volume% vocht gemiddeld | Bulkgewicht vocht (g/100 cm ³) | Bulkgewicht droog (g/100 cm ³) |
|------------|---------|------------|-----------------------------|--------------------|--|---|--------------------------------------|---------------|-------------------------|--|--|
| 1a1 | 42 | 89,9 | 244,6 | 49,5 | 267,5 | 154,7 | 128,1 | 17,19 | | | |
| 1a2 | 48 | 90,7 | 253,5 | 47,2 | 274,7 | 162,8 | 136,8 | 15,97 | | | |
| 1a3 | 3 | 90,2 | 245 | 38,8 | 257,1 | 154,8 | 128,1 | 17,25 | | | |
| 1a4 | 24 | 89,7 | 242,5 | 40,6 | 258,9 | 152,8 | 128,6 | 15,84 | | | |
| 1a5 | 26 | 90,5 | 256 | 44,4 | 271,9 | 165,5 | 137 | 17,22 | 16,69 | | |
| 2a1 | 11 | 90,3 | 228,3 | 48,5 | 250,8 | 138 | 112 | 18,84 | | | |
| 2a2 | 13 | 90 | 245,3 | 50 | 267,9 | 155,3 | 127,9 | 17,64 | | | |
| 2a3 | 22 | 90,3 | 234,3 | 44,9 | 250,3 | 144 | 115,1 | 20,07 | | | |
| 2a4 | 9 | 89,9 | 225,8 | 45,8 | 245,3 | 135,9 | 109,6 | 19,35 | | | |
| 2a5 | 36 | 91,6 | 234,2 | 47,1 | 257,8 | 142,6 | 119,1 | 16,48 | 18,48 | | |
| 3a1 | 27 | 91 | 249,8 | 46,1 | 264,3 | 158,8 | 127,2 | 19,90 | | | |
| 3a2 | 2 | 90,9 | 237,8 | 49,7 | 254,4 | 146,9 | 113,8 | 22,53 | | | |
| 3a3 | 31 | 90,1 | 277,3 | 47,5 | 243 | 187,2 | 105,4 | 43,70 | | | |
| 3a4 | 12 | 90,7 | 232,8 | 42,3 | 247,3 | 142,1 | 114,3 | 19,56 | | | |
| 3a5 | 4 | 90,1 | 223,9 | 53,1 | 253,7 | 133,8 | 110,5 | 17,41 | 24,62 | | |

Bijlage 3 c

Bodemverbeterende Fytocel op zandgrond

projekt 1333 Boot en Co

week 44 1999

week 42 2000

| Behandelingen Vol% Fytocel | Amelanchier Versgewicht in gram | | Behandelingen Vol% Fytocel | Amelanchier Versgewicht in gram | | |
|-------------------------------|-------------------------------------|---------|-------------------------------|-------------------------------------|---------|------|
| 0% | 51,7 | | 0% | 763 | | |
| 0% | 56,9 | | 0% | 637 | 700 | 100% |
| 0% | 54,2 Gemidd. | 54,3 g | 0% | 637 Gemidd. | | |
| | | | | | | |
| 12,50% | 166,9 | | 12,50% | 1854 | | |
| 12,50% | 103,2 | | 12,50% | 1637 | 1745,5 | 249% |
| 12,50% | 110,6 Gemidd. | 126,9 g | 12,50% | 1637 Gemidd. | | |
| | | | | | | |
| 25% | 223,6 | | 25% | 2024 | | |
| 25% | 128,6 | | 25% | 1614 | 1819 | 260% |
| 25% | 198,2 Gemidd. | 183,5 g | 25% | 1614 Gemidd. | | |
| | | | | | | |
| Behandelingen Vol% Fytocel | Amelanchier Drooggewicht in gram | | Behandelingen Vol% Fytocel | Amelanchier Drooggewicht in gram | | |
| 0% | 28,1 | | 0% | 432,2 | | |
| 0% | 31,6 | | 0% | 402,3 | 417,25 | 100% |
| | 33,8 Gemidd. | 31,2 g | | 402,3 Gemidd. | | |
| | | | | | | |
| 12,50% | 93,8 | | 12,50% | 1293,3 | | |
| 12,50% | 55,8 | | 12,50% | 1042,4 | 1167,85 | 280% |
| 12,50% | 59,3 Gemidd. | 69,6 g | 12,50% | 1042,4 Gemidd. | | |
| | | | | | | |
| 25% | 117,7 | | 25% | 1402,5 | | |
| 25% | 68,7 | | 25% | 1121,7 | 1262,1 | 302% |
| 25% | 110,6 Gemidd. | 99 g | 25% | 1121,7 Gemidd. | | |

Project 1405 Onderzoek naar Fyocell als bodemverbeterend materiaal

Proeflocatie Boot en Co Zundert
Week 42 2000

Lengte van de planten in cm

Gewas: *Pinus nigra ssp nigra*

| plantnr. | Behandeling 2; 12,5% | Behandeling 3; 25% |
|-----------|----------------------|--------------------|
| 1 | 108 | 120 |
| 2 | 104 | 108 |
| 3 | 115 | 112 |
| 4 | 123 | 120 |
| 5 | 104 | 100 |
| 6 | 112 | 94 |
| 7 | 108 | 102 |
| 8 | 100 | 99 |
| 9 | 102 | 125 |
| 10 | 126 | 90 |
| 11 | 162 | 118 |
| 12 | 110 | 86 |
| 13 | 120 | 110 |
| Gemiddeld | 114,92 | 106,46 |

Project 1405 Onderzoek naar Fytozell als bodemverbeterend materiaal

Proeflocatie Boot en Co Zundert
Week 42 2000

Lengte van de planten in cm
Gewas: *Amelanchier lamarckii*

| plantnr. | Behandeling 1; 0% | | | Behandeling 2; 12,5% | | | Behandeling 3; 25% | | |
|-----------|-------------------|--------|--------|----------------------|--------|--------|--------------------|--------|--------|
| | 1a | 1b | 1c | 2a | 2b | 2c | 3a | 3b | 3c |
| 1 | 117 | 103 | 133 | 150 | 170 | 145 | 145 | 140 | 160 |
| 2 | 117 | 95 | 105 | 152 | 165 | 125 | 146 | 155 | 160 |
| 3 | 124 | 90 | 115 | 136 | 155 | 145 | 146 | 140 | 165 |
| 4 | 137 | 109 | 95 | 150 | 155 | 140 | 145 | 155 | 170 |
| 5 | 128 | 93 | 105 | 150 | 170 | 140 | 155 | 160 | 155 |
| 6 | 138 | 81 | 107 | 137 | 155 | 155 | 130 | 155 | 160 |
| 7 | 127 | 122 | 116 | 152 | 160 | 150 | 155 | 155 | 165 |
| 8 | 90 | 113 | 100 | 143 | 165 | 150 | 160 | 160 | 160 |
| 9 | 123 | 108 | 105 | 134 | 150 | 145 | 139 | 150 | 170 |
| 10 | 121 | 100 | 83 | 148 | 155 | 145 | 152 | 160 | 155 |
| 11 | 134 | 107 | 88 | 138 | 150 | 140 | 158 | 160 | 150 |
| 12 | 99 | 102 | 114 | 150 | 145 | 148 | 134 | 170 | 150 |
| 13 | 87 | 104 | 102 | 150 | 140 | 155 | 160 | 150 | 138 |
| 14 | 125 | 108 | 96 | 152 | 155 | 150 | 135 | 160 | 152 |
| 15 | 114 | 97 | 120 | 154 | 150 | 150 | 146 | 120 | 154 |
| 16 | 88 | 97 | 115 | 143 | 140 | 155 | 144 | 160 | 143 |
| 17 | 108 | 103 | 107 | 140 | 145 | 150 | 160 | 155 | 165 |
| 18 | 99 | 105 | 117 | 152 | 145 | 150 | 142 | 165 | 152 |
| 19 | 110 | 102 | 110 | 155 | 150 | 150 | 148 | 155 | 140 |
| 20 | 118 | 102 | 108 | 155 | 140 | 135 | 143 | 145 | 155 |
| 21 | 102 | 103 | 115 | 153 | 150 | 140 | 160 | 155 | 152 |
| 22 | 107 | 98 | 99 | 155 | 150 | 155 | 170 | 148 | 140 |
| 23 | 108 | 101 | 108 | 155 | 144 | 145 | 155 | 148 | 150 |
| 24 | 105 | 102 | 83 | 150 | 150 | 145 | 146 | 150 | 130 |
| 25 | 97 | 109 | 92 | 155 | 150 | 140 | 155 | 140 | 135 |
| 26 | 105 | 108 | 97 | 160 | 145 | 155 | 155 | 147 | 130 |
| 27 | 105 | 122 | 114 | 150 | 140 | 160 | 130 | 155 | 155 |
| 28 | 118 | 110 | 95 | 155 | 145 | 150 | 147 | 135 | 145 |
| 29 | 100 | 93 | 108 | 160 | 135 | 160 | 153 | 144 | 152 |
| 30 | 117 | 80 | 98 | 160 | 145 | 160 | 145 | 124 | 150 |
| Gemiddeld | 112,27 | 102,23 | 105,00 | 149,80 | 150,47 | 147,77 | 148,63 | 150,53 | 151,93 |
| in % | | 100 | | 140,7 | 141,3 | 138,7 | 139,6 | 141,3 | 142,7 |

Project 1405 Onderzoek naar Fyocell als bodemverbeterend materiaal

Proeflocatie Boot en Co Zundert

Week 42 2000

Lengte van het nieuwe schot in cm

Gewas: *Pinus nigra ssp nigra*

| plantnr. | Behandeling 2; 12,5% | | | | | | Behandeling 3; 25% | | | | | | |
|--------------------------|----------------------|----|----|----|----|-------|--------------------------|----|----|----|----|------|-------|
| | 1 | 2 | 3 | 4 | 5 | Gem. | 1 | 2 | 3 | 4 | 5 | Gem. | |
| 1 | 24 | 18 | 21 | 20 | 16 | 19,80 | 30 | 26 | 23 | 19 | 19 | 23,4 | |
| 2 | 27 | 26 | 22 | 21 | 19 | 23,00 | 27 | 33 | 25 | 29 | 29 | 28,6 | |
| 3 | 34 | 32 | 30 | 31 | 30 | 31,40 | 40 | 24 | 27 | 27 | 28 | 29,2 | |
| 4 | 35 | 30 | 40 | 32 | 33 | 34,00 | 33 | 25 | 23 | 20 | 22 | 24,6 | |
| 5 | 24 | 27 | 26 | 27 | 25 | 25,80 | 24 | 19 | 22 | 23 | 24 | 22,4 | |
| 6 | 24 | 25 | 27 | 26 | 26 | 25,60 | 25 | 25 | 22 | 16 | 15 | 20,6 | |
| 7 | 23 | 30 | 25 | 22 | 24 | 24,80 | 26 | 28 | 27 | 25 | 22 | 25,6 | |
| 8 | 26 | 27 | 27 | 23 | 26 | 25,80 | 16 | 20 | 22 | 22 | 24 | 20,8 | |
| 9 | 33 | 32 | 30 | 27 | 27 | 29,80 | 38 | 31 | 29 | 26 | 30 | 30,8 | |
| 10 | 42 | 27 | 28 | 31 | 30 | 31,60 | 30 | 23 | 21 | 22 | 24 | 24 | |
| 11 | 80 | 52 | 45 | 32 | 42 | 50,20 | 38 | 32 | 30 | 35 | 28 | 32,6 | |
| 12 | 38 | 32 | 33 | 27 | 28 | 31,60 | 14 | 16 | 16 | 14 | 15 | 15 | |
| 13 | 33 | 35 | 32 | 33 | 31 | 32,80 | 35 | 22 | 19 | 18 | 22 | 23,2 | |
| Gemiddelde behandeling 2 | | | | | | 29,71 | Gemiddelde behandeling 3 | | | | | | 24,68 |

Bijlage

Fyocell als bodemverbeterend materiaal op zandgrond

projekt

plantlengte

Boot en Co

week 42

2000,0

Plant Amelanchier

| nummer | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Pinus | Pinus |
|-------------------|-------|-------|-------|--------|--------|--------|-------|-------|-------|--------|-------|
| | 0% | 0% | 0% | 12,50% | 12,50% | 12,50% | 25% | 25% | 25% | 12,50% | 25% |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| Gemiddelde lengte | | | | | | | | | | | |

In %

100%

Bijlage 12

Fytocel als bodemverbeterend materiaal op zandgrond

| Plant nummer | projekt 1333 Amelanchier | | plantlengte | | Boot en Co | | week 20 | | 1999,0 | | Pinus | Pinus |
|-------------------|-----------------------------|--------|-------------|---------|------------|--------|----------|--------|--------|----------|----------|-------|
| | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | | |
| | 0% | 0% | 0% | 12,50% | 12,50% | 12,50% | 25% | 25% | 25% | 12,50% | 25% | |
| 1 | 43,0 | 30,0 | 50,0 | 48,0 | 40,0 | 50,0 | 50,0 | 53,0 | 56,0 | 75,0 | 70,0 | |
| 2 | 47,0 | 28,0 | 40,0 | 50,0 | 43,0 | 52,0 | 43,0 | 55,0 | 60,0 | 75,0 | 77,0 | |
| 3 | 45,0 | 30,0 | 40,0 | 50,0 | 44,0 | 54,0 | 52,0 | 56,0 | 60,0 | 76,0 | 90,0 | |
| 4 | 47,0 | 38,0 | 38,0 | 45,0 | 48,0 | 53,0 | 52,0 | 48,0 | 58,0 | 84,0 | 78,0 | |
| 5 | 45,0 | 34,0 | 34,0 | 43,0 | 40,0 | 50,0 | 53,0 | 55,0 | 54,0 | 73,0 | 78,0 | |
| 6 | 42,0 | 40,0 | 36,0 | 43,0 | 44,0 | 48,0 | 54,0 | 53,0 | 70,0 | 70,0 | 85,0 | |
| 7 | 45,0 | 36,0 | 36,0 | 42,0 | 45,0 | 54,0 | 48,0 | 55,0 | 65,0 | 78,0 | 85,0 | |
| 8 | 40,0 | 38,0 | 36,0 | 43,0 | 48,0 | 53,0 | 45,0 | 50,0 | 55,0 | 75,0 | 75,0 | |
| 9 | 38,0 | 30,0 | 34,0 | 52,0 | 48,0 | 50,0 | 43,0 | 54,0 | 62,0 | 78,0 | 80,0 | |
| 10 | 42,0 | 34,0 | 28,0 | 54,0 | 47,0 | 52,0 | 60,0 | 52,0 | 54,0 | 80,0 | 76,0 | |
| 11 | 47,0 | 30,0 | 28,0 | 58,0 | 46,0 | 52,0 | 60,0 | 48,0 | 60,0 | 70,0 | 84,0 | |
| 12 | 48,0 | 45,0 | 30,0 | 54,0 | 50,0 | 50,0 | 60,0 | 53,0 | 55,0 | 70,0 | 68,0 | |
| 13 | 52,0 | 48,0 | 30,0 | 52,0 | 53,0 | 51,0 | 60,0 | 58,0 | 54,0 | 80,0 | 80,0 | |
| 14 | 50,0 | 44,0 | 32,0 | 54,0 | 52,0 | 54,0 | 61,0 | 60,0 | 50,0 | 72,0 | 76,0 | |
| 15 | 50,0 | 40,0 | 35,0 | 48,0 | 48,0 | 55,0 | 43,0 | 55,0 | 50,0 | 74,0 | 76,0 | |
| 16 | 45,0 | 48,0 | 34,0 | 52,0 | 48,0 | 54,0 | 50,0 | 55,0 | 45,0 | 80,0 | 70,0 | |
| 17 | 48,0 | 44,0 | 40,0 | 52,0 | 50,0 | 48,0 | 50,0 | 60,0 | 55,0 | 77,0 | 80,0 | |
| 18 | 59,0 | 40,0 | 38,0 | 54,0 | 54,0 | 52,0 | 50,0 | 60,0 | 55,0 | 90,0 | 82,0 | |
| 19 | 40,0 | 40,0 | 42,0 | 50,0 | 50,0 | 50,0 | 52,0 | 54,0 | 58,0 | 85,0 | 70,0 | |
| 20 | 38,0 | 30,0 | 34,0 | 50,0 | 53,0 | 53,0 | 52,0 | 60,0 | 54,0 | 84,0 | 70,0 | |
| 21 | 34,0 | 38,0 | 32,0 | 54,0 | 51,0 | | 53,0 | 60,0 | 58,0 | 70,0 | 83,0 | |
| 22 | 33,0 | 38,0 | 34,0 | 53,0 | 52,0 | | 51,0 | 52,0 | 55,0 | 72,0 | 82,0 | |
| 23 | 38,0 | 48,0 | 36,0 | 50,0 | 48,0 | | 54,0 | 58,0 | 56,0 | 75,0 | 86,0 | |
| 24 | 40,0 | 40,0 | 35,0 | 53,0 | 50,0 | | 48,0 | 63,0 | 55,0 | 76,0 | 78,0 | |
| 25 | 43,0 | 42,0 | 34,0 | 53,0 | 55,0 | | 52,0 | 70,0 | 58,0 | 74,0 | 84,0 | |
| 26 | 36,0 | 45,0 | 34,0 | 45,0 | 48,0 | | 50,0 | 63,0 | 45,0 | 78,0 | 77,0 | |
| 27 | 40,0 | 44,0 | 38,0 | 50,0 | 53,0 | | 55,0 | 62,0 | 48,0 | 78,0 | 82,0 | |
| 28 | 43,0 | 42,0 | 33,0 | 44,0 | 52,0 | | 48,0 | 54,0 | 50,0 | 85,0 | 80,0 | |
| 29 | 48,0 | 40,0 | 35,0 | 48,0 | 48,0 | | 52,0 | 50,0 | 54,0 | 70,0 | 76,0 | |
| 30 | 48,0 | 42,0 | 45,0 | 55,0 | 47,0 | | 54,0 | 50,0 | 52,0 | 75,0 | 73,0 | |
| | 1314,0 | 1166,0 | 1071,0 | 1499,0 | 1455,0 | 1035,0 | 1555,0 | 1676,0 | 1661,0 | 2299,0 | 2351,0 | |
| | 43,8 | 38,9 | 35,7 | 50,0 | 48,5 | 51,8 | 51,8 | 55,9 | 55,4 | 76,6 | 78,4 | |
| Gemiddelde lengte | 39,51 cm | | | 50,1 cm | | | 53,15 cm | | | 76,63 cm | 78,37 cm | |
| In % | 100% | | | 128% | | | 135% | | | 100% | 102% | |

Onderzoek aan FYTOCEL als bodemverbeterend materiaal

Bijlage 13

Fytocel als bodemverbeterend materiaal in zandgrond

| | projekt 1333 | | plantlengte | | Boot en Co | | week 32 | | 1999 | | | |
|-----------------|--------------|-------|-------------|--------|------------|--------|---------|---------|--------|-------|---------|--|
| | Amelanchie | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Pinus | Pinus | |
| | 0% | 0% | 0% | 12,5% | 12,5% | 12,5% | 25% | 25% | 25% | 12,5% | 25% | |
| 1 | 83 | 61 | 87 | 112 | 106 | 123 | 107 | 95 | 114 | 81 | 95 | |
| 2 | 84 | 78 | 82 | 94 | 105 | 120 | 112 | 118 | 116 | 80 | 79 | |
| 3 | 86 | 74 | 72 | 113 | 104 | 120 | 125 | 120 | 117 | 75 | 79 | |
| 4 | 76 | 72 | 66 | 103 | 97 | 85 | 109 | 118 | 119 | 88 | 92 | |
| 5 | 69 | 75 | 64 | 91 | 118 | 118 | 124 | 107 | 110 | 80 | 87 | |
| 6 | 84 | 81 | 52 | 109 | 120 | 110 | 112 | 115 | 115 | 71 | 77 | |
| 7 | 94 | 63 | 65 | 95 | 120 | 120 | 108 | 120 | 140 | 82 | 79 | |
| 8 | 50 | 54 | 54 | 110 | 94 | 117 | 103 | 123 | 118 | 77 | 81 | |
| 9 | 85 | 50 | 69 | 115 | 105 | 111 | 117 | 125 | 120 | 85 | 89 | |
| 10 | 77 | 68 | 51 | 106 | 113 | 112 | 126 | 115 | 120 | 85 | 65 | |
| 11 | 95 | 63 | 52 | 116 | 121 | 118 | 114 | 106 | 98 | 74 | 86 | |
| 12 | 66 | 63 | 57 | 120 | 110 | 104 | 124 | 116 | 115 | 79 | 75 | |
| 13 | 66 | 64 | 63 | 99 | 125 | 115 | 104 | 125 | 120 | 84 | 91 | |
| 14 | 72 | 65 | 47 | 93 | 124 | 120 | 112 | 120 | 106 | 73 | 82 | |
| 15 | 67 | 55 | 60 | 116 | 120 | 118 | 115 | 124 | 111 | 79 | 85 | |
| 16 | 63 | 62 | 74 | 105 | 116 | 120 | 112 | 107 | 110 | 78 | 82 | |
| 17 | 71 | 70 | 59 | 110 | 130 | 130 | 130 | 114 | 120 | 73 | 77 | |
| 18 | 72 | 55 | 63 | 115 | 115 | 123 | 115 | 125 | 105 | 95 | 78 | |
| 19 | 63 | 63 | 58 | 110 | 120 | 123 | 100 | 140 | 94 | 83 | 90 | |
| 20 | 67 | 69 | 59 | 108 | 110 | 124 | 110 | 130 | 105 | 85 | 90 | |
| 21 | 49 | 52 | 57 | 113 | 108 | | 103 | 125 | 120 | 73 | 83 | |
| 22 | 62 | 59 | 55 | 120 | 120 | | 115 | 125 | 106 | 75 | 82 | |
| 23 | 52 | 72 | 59 | 119 | 130 | | 119 | 123 | 123 | 78 | 86 | |
| 24 | 53 | 71 | 52 | 127 | 120 | | 105 | 125 | 120 | 76 | 84 | |
| 25 | 45 | 65 | 51 | 120 | 125 | | 102 | 124 | 99 | 79 | 85 | |
| 26 | 43 | 62 | 52 | 112 | 120 | | 106 | 122 | 104 | 83 | 79 | |
| 27 | 62 | 74 | 58 | 120 | 122 | | 107 | 110 | 117 | 79 | 84 | |
| 28 | 82 | 50 | 66 | 117 | 115 | | 113 | 130 | 106 | 86 | 75 | |
| 29 | 64 | 52 | 49 | 109 | 124 | | 119 | 117 | 88 | 72 | 85 | |
| 30 | 64 | 65 | 60 | 123 | 107 | | 125 | 108 | 106 | 79 | 84 | |
| | 2066 | 1927 | 1813 | 3320 | 3464 | 2331 | 3393 | 3572 | 3362 | 2387 | 2486 | |
| | 68,87 | 64,23 | 60,43 | 110,67 | 115,47 | 116,55 | 113,1 | 119,07 | 112,07 | 79,57 | 82,87 | |
| Gemiddeld in cm | | 64,51 | | | 115,04 | | | 114,75 | | 79,57 | 82,87 | |
| In % | | 100% | | | 178,32% | | | 177,89% | | 100% | 104,10% | |

Onderzoek aan FYTOCEL als bodemverbeterend materiaal

Bijlage 14

Bodemverbeterende FytoCELL op zandgrond

projekt 1333

plantlengte in cm

Boot en Co

week 44

1999

| | Amelanchië | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Amel. | Pinus | Pinus |
|-----------------|------------|----------|-------|--------|----------|--------|--------|---------|--------|-------|---------|-------|
| | 0% | 0% | 0% | 12,5% | 12,5% | 12,5% | 25% | 25% | 25% | 25% | 12,5% | 25% |
| 1 | 81 | 59 | 85 | 105 | 104 | 123 | 115 | 125 | 104 | 80 | 78 | |
| 2 | 84 | 77 | 65 | 110 | 105 | 119 | 104 | 93 | 114 | 82 | 98 | |
| 3 | 85 | 75 | 71 | 92 | 106 | 123 | 115 | 120 | 113 | 78 | 78 | |
| 4 | 75 | 72 | 64 | 113 | 103 | 81 | 125 | 115 | 115 | 90 | 81 | |
| 5 | 65 | 74 | 62 | 103 | 98 | 118 | 107 | 116 | 108 | 80 | 93 | |
| 6 | 82 | 78 | 48 | 89 | 118 | 108 | 122 | 106 | 103 | 71 | 87 | |
| 7 | 92 | 63 | 62 | 109 | 120 | 123 | 116 | 116 | 119 | 85 | 77 | |
| 8 | 67 | 55 | 54 | 93 | 118 | 115 | 111 | 124 | 120 | 82 | 82 | |
| 9 | 83 | 50 | 67 | 108 | 93 | 111 | 100 | 121 | 111 | 85 | 81 | |
| 10 | 75 | 67 | 47 | 111 | 104 | 106 | 116 | 125 | 118 | 86 | 88 | |
| 11 | 95 | 61 | 48 | 106 | 113 | 120 | 130 | 115 | 118 | 83 | 65 | |
| 12 | 61 | 68 | 56 | 112 | 119 | 105 | 114 | 110 | 97 | 80 | 87 | |
| 13 | 65 | 66 | 65 | 118 | 105 | 107 | 129 | 116 | 114 | 88 | 76 | |
| 14 | 73 | 65 | 46 | 99 | 130 | 123 | 99 | 128 | 120 | 78 | 93 | |
| 15 | 68 | 53 | 70 | 95 | 118 | 119 | 113 | 120 | 106 | 82 | 80 | |
| 16 | 56 | 62 | 71 | 116 | 121 | 130 | 114 | 123 | 107 | 83 | 82 | |
| 17 | 74 | 75 | 57 | 100 | 114 | 130 | 115 | 104 | 108 | 73 | 74 | |
| 18 | 71 | 51 | 63 | 110 | 137 | 124 | 124 | 113 | 119 | 97 | 72 | |
| 19 | 62 | 60 | 59 | 117 | 114 | 127 | 111 | 120 | 110 | 85 | 88 | |
| 20 | 64 | 64 | 60 | 107 | 118 | 125 | 99 | 140 | 97 | 88 | 89 | |
| 21 | 49 | 51 | 59 | 101 | 107 | | 109 | 130 | 104 | 71 | 84 | |
| 22 | 59 | 56 | 54 | 111 | 111 | | 98 | 125 | 121 | 77 | 82 | |
| 23 | 50 | 70 | 60 | 110 | 121 | | 115 | 129 | 106 | 83 | 86 | |
| 24 | 51 | 69 | 51 | 119 | 126 | | 120 | 124 | 120 | 80 | 82 | |
| 25 | 43 | 60 | 47 | 123 | 123 | | 105 | 124 | 120 | 82 | 83 | |
| 26 | 45 | 61 | 56 | 117 | 125 | | 103 | 125 | 98 | 88 | 81 | |
| 27 | 56 | 75 | 57 | 109 | 120 | | 103 | 122 | 100 | 82 | 83 | |
| 28 | 83 | 45 | 65 | 118 | 126 | | 103 | 110 | 116 | 90 | 72 | |
| 29 | 65 | 50 | 40 | 117 | 123 | | 112 | 130 | 103 | 72 | 84 | |
| 30 | 61 | 65 | 63 | 106 | 126 | | 118 | 118 | 88 | 82 | 81 | |
| | 2040 | 1897 | 1772 | 3244 | 3466 | 2337 | 3365 | 3587 | 3297 | 2463 | 2467 | |
| | 68,00 | 63,23 | 59,07 | 108,13 | 115,53 | 116,85 | 112,17 | 119,57 | 109,90 | 82,10 | 82,23 | |
| Gemiddeld in cm | | 63,43 cm | | | 113,4 cm | | | 114,11 | | 82,1 | 82,23 | |
| In % | | 100% | | | 178,80% | | | 179,90% | | 100% | 104,10% | |

Onderzoek aan FYTOCELL als bodenverbeterend materiaal

