FLOWFORM
WATER RESEARCH

1970 – 2007

A Collation of Research and Related Ideas

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Healing Water Institute

FLOWFORM
WATER RESEARCH
1970 – 2007

Part Five
Current Research Case Studies

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Current Research
Case Studies

"In an age when man has forgotten his origins and is blind even to his most essential needs for survival, water along with other resources has become the victim of his indifference."

Rachel Carson 1907 - 1964

Numerous colleagues around the world have carried out research since the discovery of the Flowform Principle by John Wilkes in 1970. However the main research has been conducted in the Healing Water Institute of the UK, at Emerson College, Sussex, England.

One of the main areas of ongoing research is investigating and analysing the effect of Flowform treatment on plant growth. Different research projects were carried out at the Healing Water Institute using lettuce plants in the field (RP. 2), as well as cress (RP. 1) and wheat (RP. 3) under laboratory conditions.

Research Project 1:

The Effect of Flowform Treatment on Cress Germination and Growth

Orit Loyter (2005)

Abstract

Investigations into the effect of Flowform treated water on cress germination and growth, in comparison to tap water, were carried out from May to August 2004. The tests were performed eight times a month with respect to the moon cycle. After a 4-day growth period the length of shoots and roots was measured as an indicator for the water quality. It was found that on average the Flowform treatment promoted growth, with the largest difference being observed in root growth. The experiments indicated that seedling growth might show a pattern in accordance with the lunar cycle.

Introduction

This research project was aimed at investigating the effect of Flowform treated water on plant growth. The first stages of cress germination and growth were examined, as it is known that during the first stages of growth the plant is very sensitive to its surroundings and previous research was checked for relevance.

Maria Thun (2003) and others showed that the treatment during those first developmental stages had an influence on the whole life of the plant. One of the most extended experiments examining the influence of Flowform treated water on plant growth was conducted in Holland by Prof. Jan Dick van Mansfeld of Warmonderhof Farm School (Van Mansfeld 1986). Other research examined the effects of Flowform eco-technology as part of a system treating wastewater, for example Spencer (1995) and Mæhlum (1991).

Rudolf Steiner in his agricultural lectures mentioned the close connection between plant growth and planetary movement (Steiner 1938).

These ideas have been incorporated into Biodynamic Agriculture. It has been established by a number of researchers that the different phases of the moon as well as other planetary influences have a strong effect on the growth of plants (Lawrence Edwards 1993, Georg Schmidt 1984, Theodor Schwenk 1967, Maria Thun 2003).

Research by Freya Schikorr (1990) suggested that it is possible to enhance lunar influences on plant growth by treating water rhythmically through Flowform cascades.

It was found that Flowform treatment promoted especially root growth, and that the rhythmical movement of the water seems to have a positive effect upon biological processes due to an increase in its sensitivity.

Materials and Methods

The cress growth experiments were carried out with a method developed by Hiscia Cancer Research Institute in Arlesheim, Switzerland. A sheet of Whatman Nr 1 filter paper (14 x 8.5 cm) was placed in a plastic envelope (21 x 12.5 cm) sealed for the duration of growth. To each envelope 3 ml of the specific water sample were added.

Twelve biodynamic cress seeds (from Botton Village, Yorkshire Biodynamic Seed Producers and, for some experiments, from Stefan Baumgartner in Hiscia) were lined up in a row equidistantly inside the envelope. The seeds were placed horizontally across the filter paper 10 cm from the bottom using a cardboard pocket into which the envelope was temporarily placed. Six replicates, each in a separate envelope, were prepared from each water sample. After closing the seal the envelope was hung in a light tight box on two rods. The seedlings were left to grow in the dark for 96 hours at constant humidity and temperature (approx. 55% and 21° C).

Following an initial period of studying the method and its applications 22 experiments were performed between May 4th and July 31st 2004.

Water Treatment

In each experiment four different water samples were used: the control and three out of the four available Flowform cascades. All cascades were made from a series of Flowform Laboratory Stackable models.

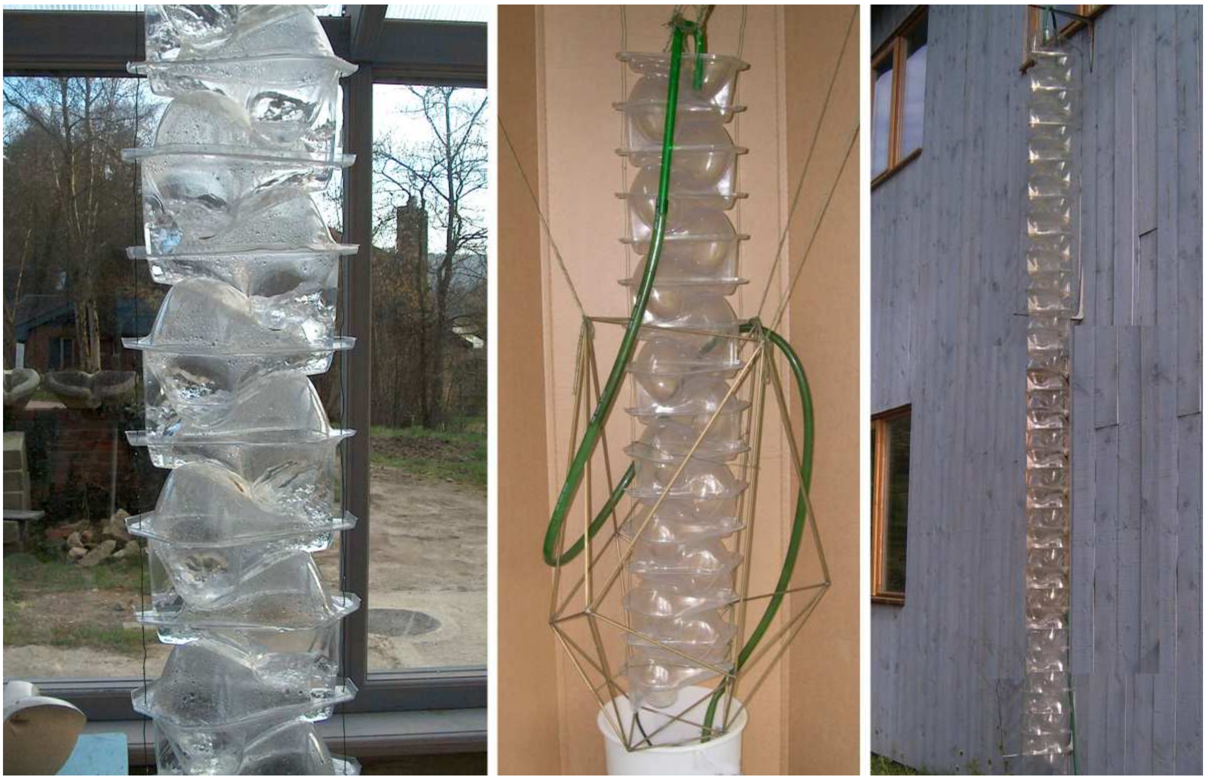
Three Flowform cascades (See Fig 28 below, FG, FJ and FJI) were used consisting of 16 stackable plastic Flowform units each. Cascades FG and FJ were placed in different locations and cascade FJI was partially surrounded by a geometrical form - a projected Icosahedron made of bronze rods. The fourth cascade (FW) consisted of 38 units of the same Laboratory Stackable models.

The projected icosahedron was developed by John Wilkes utilizing projective geometry methods. A similar projected geometric envelope surrounding a vertical Flowform cascade was set up in Norway in a factory that produced grain milk. Previous studies by Nick Thomas suggested that such a form would enhance the Flowform effect on water.

The water was circulated through Flowform cascades FG, FJ and FJI for a period of one hour by a centrifugal pump ((Kockney Koi Yamitsu submersible fountain pump, model KKYFP2400) at a flow rate of 6 l/min prior to taking a sample at the outlet of the last Flowform vessel.

Fig. 28: The stackable Flowform cascades used in the experiments.

FG Cascade and FJ Cascade	FJI Cascade	FW Cascade
16 Vessels	16 Vessels through an icosahedron	38 Vessels



Water flowed into cascade FW directly from the tap through a water hose, whereas electrical pumps were used on the three other cascades. All water samples were taken at 8:00 am.

To summarise: the following cascades were used for the experiments (refer Fig. 28 above):

- **FW cascade** consisting of 38 stackable Flowform vessels through which the water is allowed to flow once.

- **FG and FJ cascades** consisting of the same 16 stackable vessels but placed in two different locations.

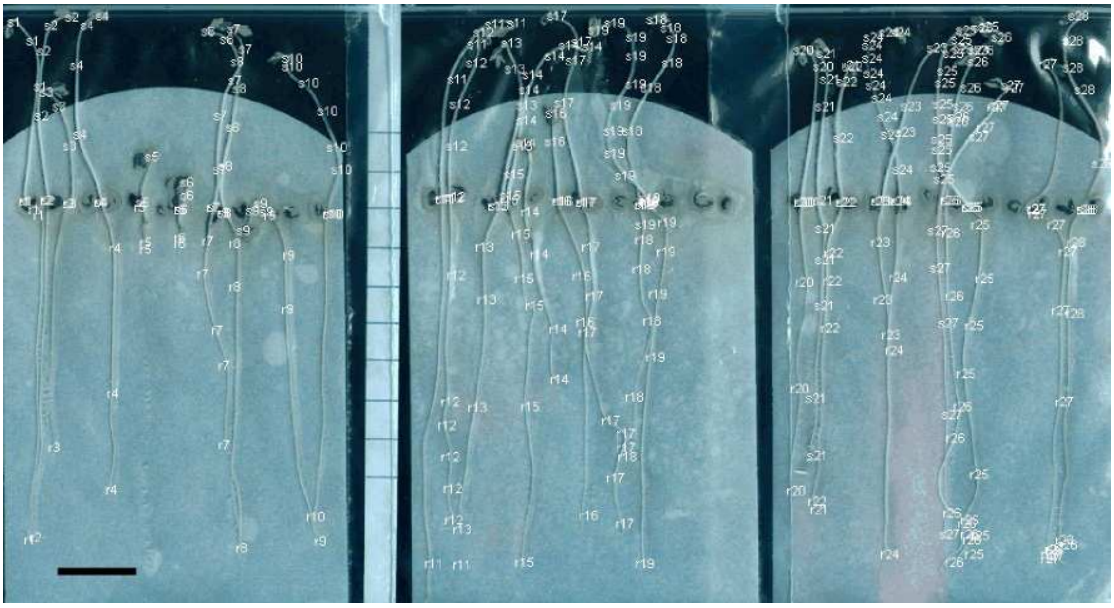
- **FJI cascade**, the same as FG, but partially surrounded by a projected Icosahedron made of bronze rods. The projected geometrical form was 100 cm and the cascade 150 cm high.

Measurement and Statistical Analysis

After the 4-day growth period, the results were scanned for each sample and the length of shoots and roots was measured using National Institute of Health (NIH) image software and a special macro program (designed by Dr.J.Schwuchow). The program makes it possible to digitise shoot and root segments and calculate the total lengths.

In each of the experiments, the length of shoot, root and total growth were indicated in either absolute values or in percentages of growth with respect to the control. In all experiments, t-tests were carried out, and results were considered significant if P is less than 0.1. Mean growth was calculated using only the germinated seeds.

Fig. 29: Three envelopes with cress seedlings show overlaid size markers using NIH image software to demonstrate the measurement technique. Bar = 20 mm



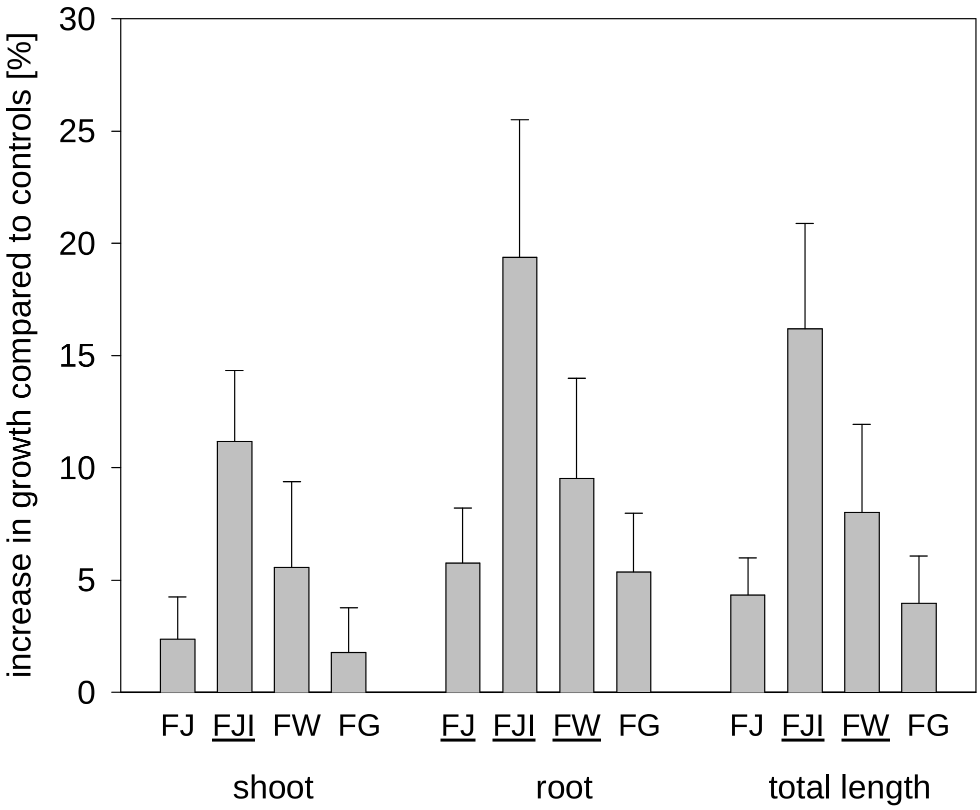
Results and Discussion

Seedling Growth in Flowform Water

The mean increase in the shoot, root and total seedling length compared to the growth of the control is shown below in **Fig. 30**. The averages were calculated by using the germinated seeds only. The average germination rate was about 60%-70%.

To check the statistical significance, t-tests were carried out and the parameter P with $0 \leq P \leq 1$ was determined. The closer P gets to 0, the more significantly different the two sets of data are. When $P \leq 0.1$, the groups are considered statistically significantly different (underlined labels in Fig. 30).

Fig. 30: Mean increase in cress seedling growth treated with water from Flowforms FJ, FJI, FW and FG with respect to the control. The mean results of all 22 experiments are shown for shoot, root and total seedling length. Samples that are statistically different from controls are underlined. Error bars: standard error [SE]



The increase in root growth of plants treated with Flowform water compared to untreated controls was larger than the increase in shoot growth.

Mean increase in shoot growth from all Flowform water is 4.4 ± 1.3% [SE] with respect to the controls, compared to a 8.8 ± 1.9% [SE, statistically different] increase for root lengths.

Comparing the results from different Flowform treated water demonstrated that cascades FJI and FW showed a much larger additional growth (11.2 and 5.6% respectively for shoots, and 19.4% and 9.5% for roots) in comparison with cascades FJ and FG (2.4% and 1.8% for shoots and 5.8% and 5.4% respectively for roots).

The highest mean increase in root growth was found after treatment with water from the FJI cascade (19.4 ± 6.1% [SE], Fig. 30).

In a few experiments the amount of oxygen in the control water was increased, which did not result in any detectable effect. The location of FG had no significant effect, since cascades FG and FJ produced similar results.

Patterns of Root Growth in May, June and July in Relation to the Moon Phases

It was investigated whether the patterns of variation in root growth could be correlated with moon phases.

Therefore, all root lengths from experiments in the months of May, June and July 2004 were plotted chronologically and compared.

It appeared that there may be a correlation between root growth and the moon phases. In all three months, root lengths reached a maximum about one week after full moon, and in some cases a somewhat smaller peak a few days after new moon.

Root lengths were at a minimum at the time of or shortly after full moon and at or shortly after new moon.

It can be noted that in all samples in May, June and July (Fig. 31 a, b and c) the gradients of changing root lengths were rather similar, i.e. the connecting lines are similar regarding their slope.

This indicated that there might be some changing effect on growth during the course of the month, which may influence all the samples in a similar way.

This pattern was more obvious in June and July (Fig. 31 b, c) than in May (Fig. 31 a).

Fig. 31: Root lengths through (**a**) May, (**b**) June and **(c)** July with respect to the moon phases

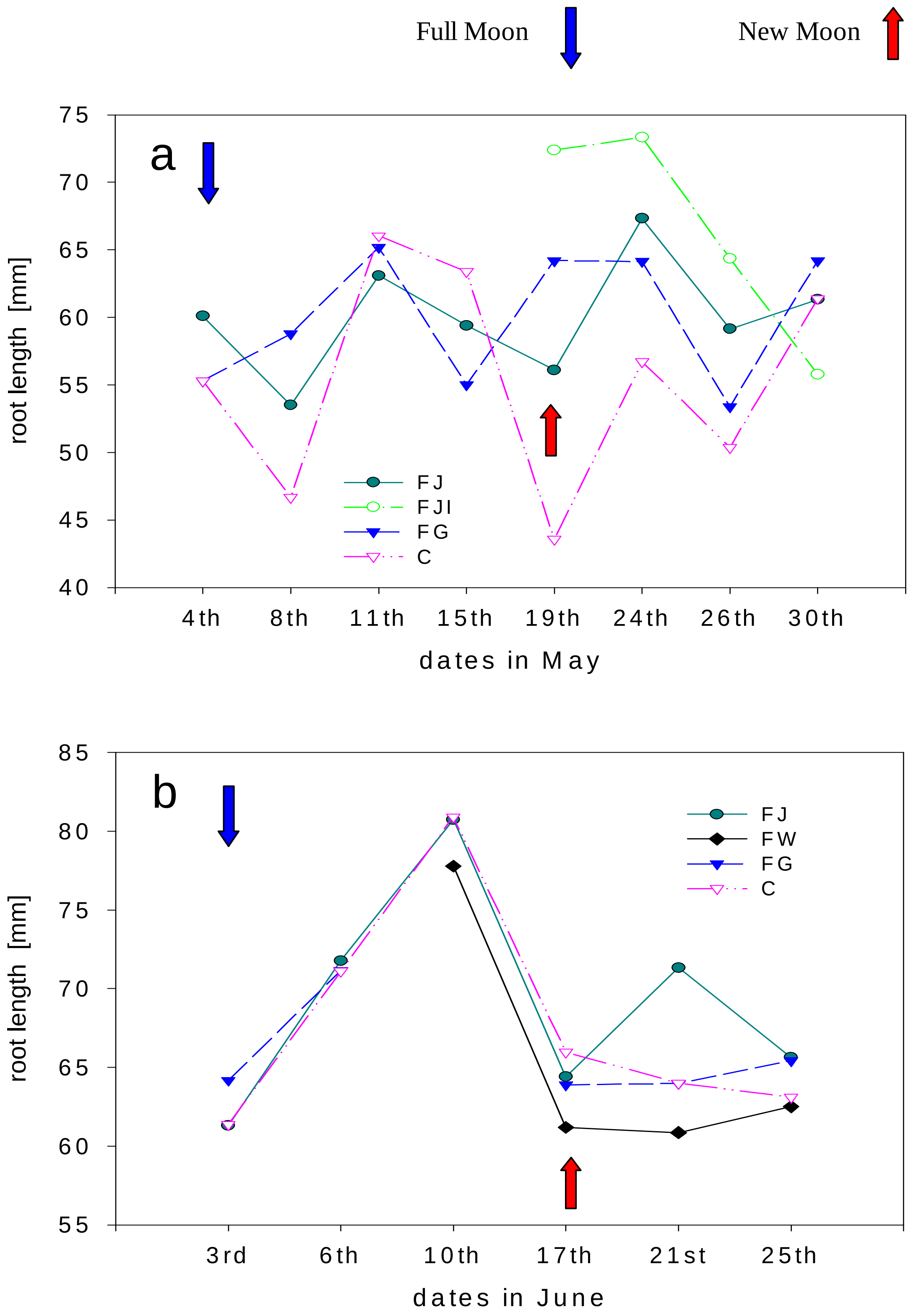
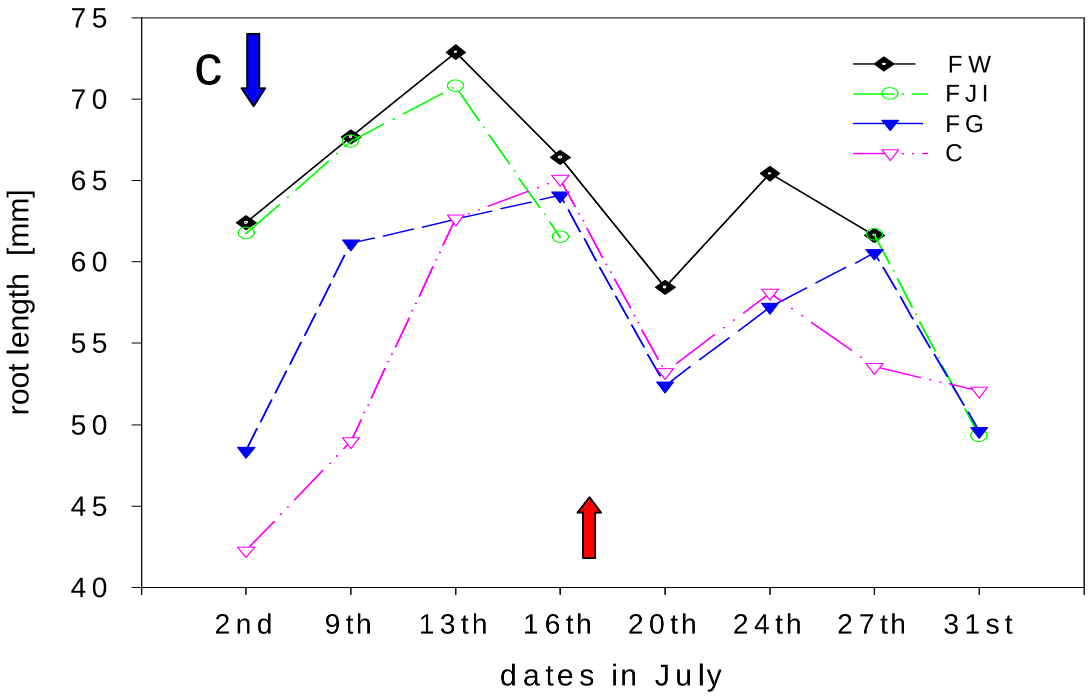


Fig. 31c continued



In order to examine whether Flowform technology had a specific influence independent of the general fluctuations during the course of the month, the average root growth of each Flowform treated seed sample was divided by the control growth in the same experiment.

This data indicates the relative growth (%) of samples treated with Flowform water with respect to the controls and show the specific Flowform influence.

At certain times during the course of the month, Flowform water appeared to promote growth significantly (around May 24th, July 2nd and 27$^{th)}$, and at other times there was no effect (around May 11th and July 16th), or possibly even a slight inhibition of growth (May 19th and June 17th). In all three months there was a minimum of growth in Flowform treated samples around new moon.

Figure 32 below shows that in most cases Flowform watered seeds produced the greatest relative increase in growth between new moon and full moon.

This is also the period when root lengths reach a maximum (see Fig. 31), indicating that the Flowform influence might have a tendency to enhance existing growth patterns.

Fig. 32: Length of roots grown in Flowform treated water divided by root growth of control through **(a)** May, **(b)** June and **(c)** July 2004

Full Moon New Moon

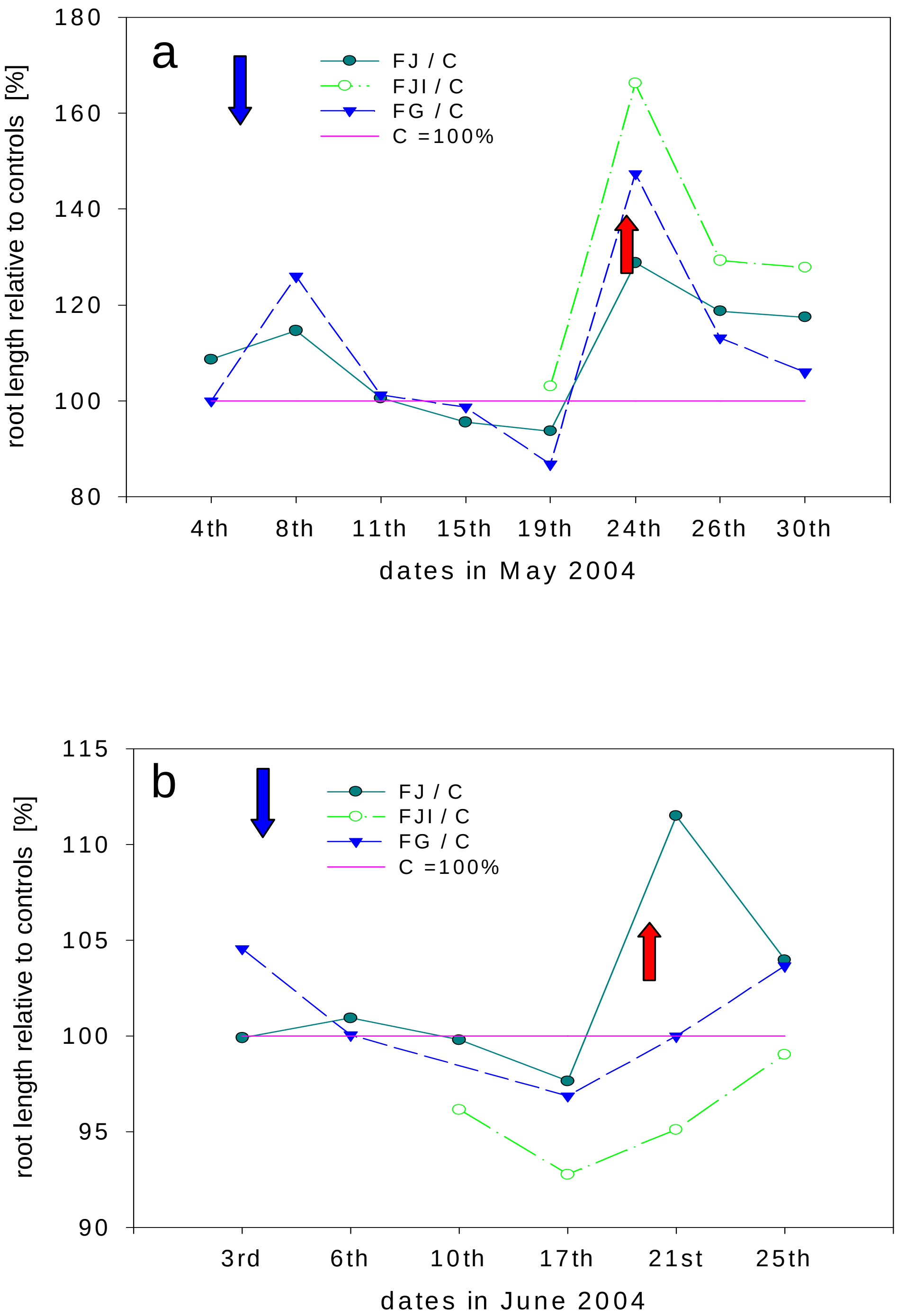
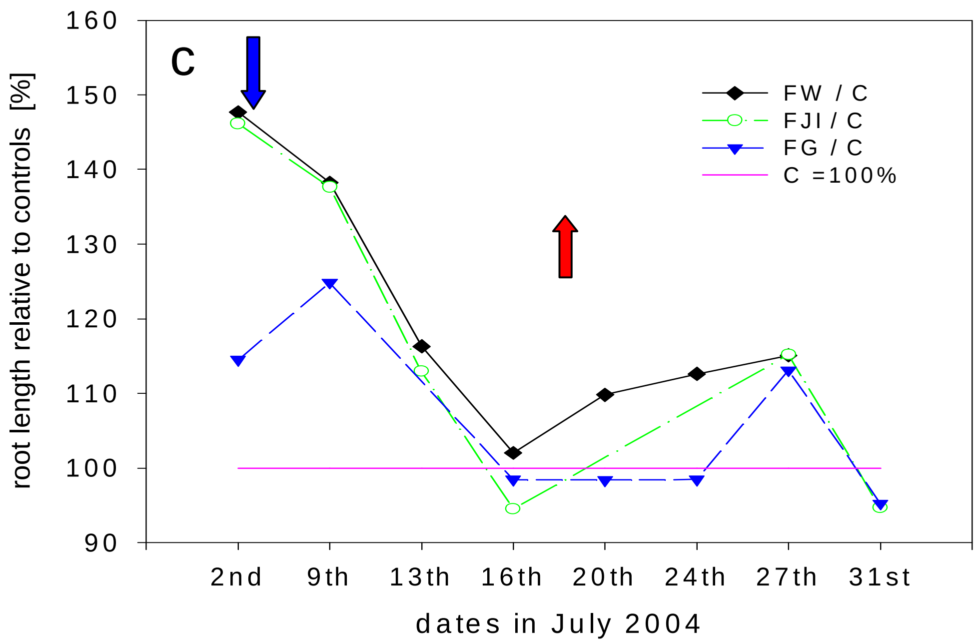


Fig. 32c continued



Main Results and Conclusions

Flowform treatment of water promoted plant growth, and the difference between Flowform treated and control samples were more pronounced in root than in shoot lengths.

However, this increase in growth was not constant over the period investigated. The lunar phases were also scrutinized as possible influencing factor causing these changes. The experiments indicated that seedling growth shows a pattern in accordance with the moon phases. The relative growth of Flowform samples with respect to the controls reached a minimum around new moon in all three months.

Only by repeating these experiments on a more extended time scale can we draw more precise conclusions.

It is our hope to take this work further as we continue to use the cress growth as an indicator for water quality. Some of this further work can include:

1. Examining the influence of the pump and of the oxygen level on growth. Exploring the dissolved oxygen (DO) levels and establishing controls with identical oxygen levels using a pump and hand stirring.
2. Examining other parameters such as temperature and pH.

3. Experimenting further with the cosmic influences on growth – looking on the three aspects of the moon position (phases, distance from the horizon and position in the zodiac) and choosing the days of the experiments accordingly.
4. A further investigation can look into the effect of different pumps and different Flowform designs on growth.

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Research Project 2:

The Influence of Flowform Treatment on Lettuce Growth

- Andrea Tranquilini, Heidi Terry and Orit Loyter (2004)

Acknowledgements: We thank John Wilkes and Arjan Huese for support and advice in this research collation.

Abstract

Lettuce was grown in the field in the summer of 2004 to investigate the influence of Flowform treatment on the irrigation water. The experiment included three lettuce groups where the Flowform Vortex model was used to treat water that was applied:

1) Only at the green house stage.
2) During the whole growth period,
   Both were compared with
3) Controls treated with tap water.

The investigation included a series of observations (on colour, shape, leaf sequence, general appearance, germination rate, leaf size etc.) conducted once a week. After harvesting the lettuces were observed, tasted, weighed and tested for pH, and differences were detected in most parameters.

The weight of lettuce irrigated with Flowform treated water increased by 32%, appeared more vibrant in colour and texture and tasted more bitter (the latter related to the type of lettuce chosen). The lettuce which was grown in Flowform treated water only at the greenhouse stage had characteristics that were mostly in between the two other groups, but closer to the full Flowform treatment lettuce.

Introduction

The rhythmical movement of water that can be induced by Flowform technology appears to have a positive effect upon biological processes due to
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an increase in its sensitivity and oxygen content (Schikorr 1990, Van Mansfeld 1986, Wilkes 2003).

In these experiments, the growth of the lettuce is used as an indicator for the quality of the water as well as to investigate the practical advantages of the use of Flowform treated water as means of crop irrigation.

We were able to combine different research methods to assess lettuce growth and quality. We have performed quantitative measurements as the lettuce was grown and harvested (such as weight, root length, size, pH, soil content).

Materials and Methods

The experiments consisted of three groups of lettuce: one grown in Flowform water, the second in tap water and the third grown in Flowform water in the green house, then in tap water after replanting, making it possible to observe the influence of the Flowform treated water at the green house stage and during the whole growth period.

On June 6th, lettuce seeds (type *Cocarde*) were sown in three trays in the green house, each tray containing 120 seeds. The soil used was a mixture of peat and compost made into soil blocks. The seeds were grown in the glasshouse for a period of three weeks in which they were watered according to need, usually every other day with about 0.5 litres of water per tray. All trays were watered at the same time and given the same amount of water. Two trays were irrigated with the Flowform Vortex treated water and one was irrigated with tap water. On the days of watering, the tub containing the water for the Flowform Vortex cascade was filled with tap water, then the water was circulated through the forms for 60 min starting at 7:30 a.m with a centrifugal amphibious submersible pump P1800 with a flow rate of approximately 80 litres/min. Tap water was used as control.

On June 27th, 21 days after sowing, the lettuce was transplanted consecutively into three plots in the upper garden at Emerson College, Sussex where the Healing Water Institute is. Each plot contained 70 lettuce seedlings planted in three rows.

In plot one, the tap-irrigated seedlings (TT) were planted and they continued to be irrigated with tap water. In plot two and three the Flowform irrigated seedlings were planted. Plot two was irrigated with tap water after planting (FT), and plot three with Flowform treated water (FF). A gap of 1.5m was kept between plot 2 and 3 to avoid water drainage.

Biodynamic (BD) Preparation 500 was sprayed on all crops (made by mixing in Flowform treated water for all groups). The lettuce was allowed to grow until August 23rd. During this time the plots were irrigated when needed (about twice a week). The seedlings were irrigated with the same amount of water (about 35 litres per plot), and irrigation was monitored so that all plots received the same amount of water. There was hardly any rain during the growth period in the field; therefore most of the water received by the lettuce was through irrigation.

Throughout the experimental period, the lettuces were observed once a week. On the 23rd of August, eight weeks after transplanting into pots, the lettuce was harvested and analysed. Soluble contents were measured according to the Brix method.

Results and Discussion

The Greenhouse Stage: At the greenhouse stage, FF and FT received identical treatment; both being irrigated with Flowform treated tap water. (see below) After transplantation into the field however, their treatment became different in that FF was irrigated with Flowform water and FT with tap water only.

Fig. 33: Germination rates measured on the 4th and 8th day after planting. Total numbers and percentage values in brackets.

	FF Flowform	**FT Flowform/Tap**	**TT Tap**
June 6th : No. of planted seeds	120 (100%)	120	120
June 10th: no. of germinated seeds	53 (44.2%)	55 (45.8%)	43 (35.8%)
June 14th: no. of germinated seeds	95 (79.2%)	99 (82.5%)	93 (77.5%)

The FF and FT seedlings germinated earlier than the tap water control, the biggest difference (25.6%) was observed 4 days after planting (Fig. 33). However, on day 8 after planting, the mean difference had decreased to 4.3%, until later no differences could be observed.

Roots of three seedlings of the same leaf size were chosen randomly from each of the three trays and measured before transplanting from greenhouse to field, and no differences in root length could be detected.

At this stage, subtle differences were observed comparing the growing seedlings. The plants treated with Flowform water seemed more delicate in colour and shape, and the control plants were darker and more condensed.

Just before replanting, seedlings in the trays were observed on July 27th as well as once weeks while the lettuces were grown in the field. All three trays were filled up completely so that the number of plants was identical. The soil in the trays that were irrigated for three weeks with Flowform treated water looked fresher, brown and more alive in comparison with the tap water tray that was dry and mouldy (refer Fig. 34).

Fig. 34: Soil in Flowform and Tap Water trays (July 27)

Flowform Water Tray

Tap Water Tray

The Growing Period in the Field

The lettuce was grown in the field from July 27 to August 23. During this period, plants were observed on three occasions (July 29, August 2 and 23) and the results of the three observations were combined.

Number of leaves (measured July 29): In each plot, 15 plants were chosen randomly, by picking the 6th, 12th, 18th, 24th, and 30th plant in each of the three rows (total of 5 plants per row). For each plant the number of leaves was counted. The average number of leaves was higher for plants treated with Flowform water (8.3 for FF plants, 8.2 for FT, and 7.4 for tap watered TT plants, see Fig. 4).

The mean pH values were 6.8 for the FF plot, 7.1 for FT, 6.8 for TT, and 7.0 in the gap between the plots (with three pH measurements each), indicating that the pH value was not altered significantly in the different plots (Fig. 4).

Phenomenological observation

Phenomenological observations were carried out four times, on July 27 and 29, and on August 2 and 23.

The FF & FT (F = Flowform influenced) plants seemed to be slightly larger on the whole. Most differences though had to do with the way the plants looked. The F lettuce leaves had a lighter vibrant green colour compared with the darker tap lettuce. The F plants looked younger, livelier and fresher. In the leaf sequence the F lettuce appear more expansive and the individual leaves more luscious (three dimensional), narrower and ordered (**Fig. 35a & 35b** show leaf sequences). The tap lettuce gave a contractive and more central impression (Both **Fig. 35** shows the individual leaves). The roots of the F lettuce were longer and had slightly more hairs.

Fig. 35a: Leaf sequences on August 4th

FF FT TT

Fig. 35b: Leaf sequences on August 15th

FF FT TT

Final Analysis of the Lettuces after Harvesting

Fig. 36: Data for lettuce plants irrigated with Flowform water continuously (FF), only at the greenhouse stage (FT), and with tap water (TT). SE: Standard Error. Underlined numbers indicate a statistical significant difference with respect to the TT controls (P<0.1).

	FF Flowform Water	**FT Flowform Water At Greenhouse Stage**	**TT Tap Water**
Number of leaves	8.27 ± 0.54 [SE]	8.20 ± 0.34 [SE]	7.40 ± 0.36 [SE]
Mean pH value of soil	6.8	7.1	6.8
Mean root length [cm]	<u>21.67</u> ± 0.73 [SE]	18.67 ± 0.88 [SE]	17.83 ± 1.42 [SE]
Mean weight [g]	<u>178.4</u> ± 8.6 [SE]	<u>168.7</u> ± 8.0 [SE]	134.7 ± 7.8 [SE]
Total weight [g]	7137	6748	5388
Increase in total weight compared to control TT [%]	32.5%	25.2%	-
Soluble content	<u>1.44</u> ± 0.19 [SE]	1.68 ± 0.14 [SE]	2.04 ± 0.17 [SE]

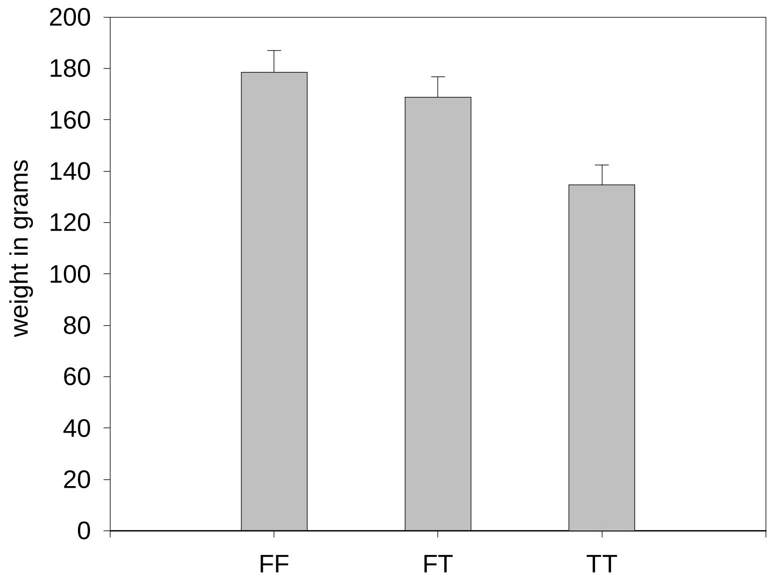
General impression:

The FF lettuces were larger in size and had more leaves than the FT samples, the TT plants being the smallest of all. No other apparent differences in colour or texture could be detected. Roots appeared to be thicker in FF and FT plants, and the soil seemed to be harder to remove compared to tap watered plants.

Lettuce Weight

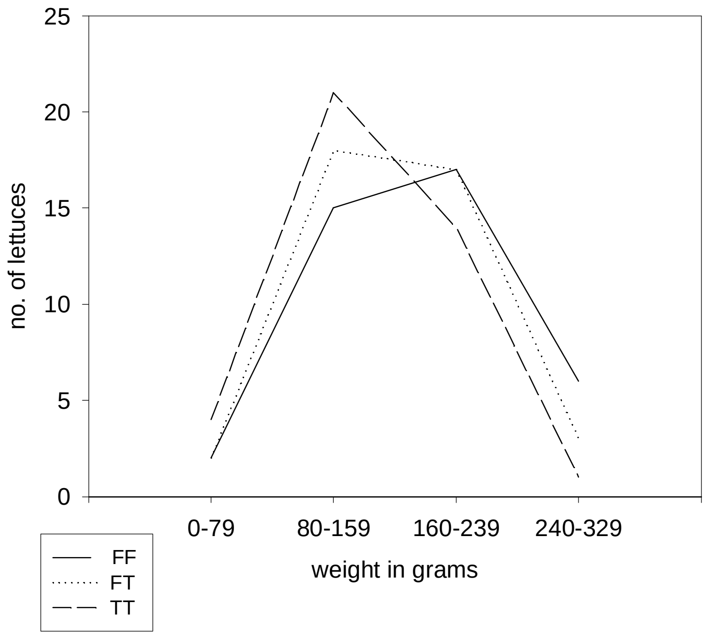
Beginning in the east side of each plot, the first 40 lettuces were harvested from two out of the three rows in each plot. The average lettuce weight increased by 32.5% for FF samples and 25.2% for FT samples with respect to the plants irrigated with only tap water (Figs. 36 and 37).

Fig. 37 - **Mean weight of the lettuce samples: FF** (only Flowform water), **FT** (Flowform water, then tap water) and **TT** (tap water) after harvesting



The distribution of lettuce weight (i.e. the number of lettuces in each weight group) shows that the increase of weight in the Flowform watered FF and FT groups is due to the fact that these groups have more lettuces of average weight than the TT lettuces (Fig. 38).

Fig. 38: Weight distribution of individual lettuces, samples FF, FT and TT



This is a very desirable quality from the productive point of view. In contrast, most of the tap-watered lettuces (TT) belong to the groups with smaller weight.

Soluble content tests

All measurements were conducted on the 7th leaf of 5 lettuces of each type. Soluble contents (measured with the Brix method) were highest in lettuce irrigated with tap water and lowest in lettuce irrigated with Flowform water.

Taste test

Leaves No. 9 and 10 of the lettuces type FF and TT were removed from the plant, washed and placed in two bowls numbered 1 and 2. Fifteen people were asked to taste a whole leaf from each bowl and to wash their mouth between tastes. They were asked to comment on the difference of the taste.

Most people commented on the sweetness / bitterness of the leaves. The lettuce irrigated with Flowform treated water seems to be more bitter and stronger in flavour and texture than the lettuce irrigated with tap water.

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Research Project 3:

Influence of Flowform Water on Wheat Growth

Introduction

In several laboratories, indications have been found that water is capable of storing and transmitting information on substances it has been in contact with (Belon et al. 1999, 2004, Davenas et al. 1988, Ludwig 1991).

It has been demonstrated that transmission of chemical information to a solution is possible electronically in the absence of a transport of molecules (Schiff 1995), and electromagnetic frequencies were transmitted to water through a sealed ampoule (Gross 2000b).

The spontaneous formation of higher order clusters ('coherent domains') in water leads to structures that vibrate at high frequencies. These structures are referred to as crystalline-fluid, since it has a similar high degree of order as a crystal. Coherent domains transmit long-range electromagnetic fields that can lead to qualitatively new effects (Del Giudice & Preparata 1994).
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Wolfgang Ludwig (1991) and Peter Gross (2000b) presume that water transmits such information to living organisms, and depending upon the wavelength, these frequencies can be life supporting or conversely they can be injurious. The information stored in water can be altered or erased either by heating or by repeated rhythmical swirling movement (Gross 2000a).

Flowform cascades generate such rhythmical lemniscatory and vortical movements. This research project was aimed at investigating the effect of Flowform treated water on plant growth. The influence of several geometrical 'sheaths' around a Flowform cascade was evaluated.

Materials and Methods

To investigate the effect of Flowform water on plant growth, wheat seedlings were grown in different water samples treated with Flowform cascades. All samples used the same equipment and the same brand of centrifugal pump (Kockney Koi Yamitsu submersible fountain pump, model KKYFP2400) for one hour's water circulation at a flow rate of 6 l/min. Only for the Flowform Vortex model, which requires a much higher flow rate (200 lt/min, FV in Fig. 14), was an in-line Hydrostal helical screw pump used.

Fig. 39: Rotating table with wheat seedlings

Biodynamic wheat seeds from a harvest in 2004 from Tablehurst Farm were used for the experiments. Twelve wheat seeds were placed equidistantly on a mesh that was fixed inside each glass containing the water sample (Figs.39 above & 40 below).

All glasses were placed on a rotating table in order that light is evenly distributed. Wooden divisions and a central plastic pipe separated different samples so that they are not contaminated by each other's presence.

The roots grow through a nylon mesh into the water (Fig. 2). After 8 – 16 days, the seedlings were photographed and analysed. On the day of the experiment, water samples were used for capillary dynamolysis.

Fig. 40: Wheat seedlings germinating on top of nylon mesh after 2 days (left) and 4 days (right)

Measurement and Statistical Analysis

After a growth period of 8 - 16 days, the results were photographed and root lengths were measured from digital images using NIH-image software and the macro described in section 4.1 (Fig. 41).

In all experiments, t-tests were carried out, and results were considered significant if P was less than 0.05. Mean growth was calculated using only the germinated seeds.

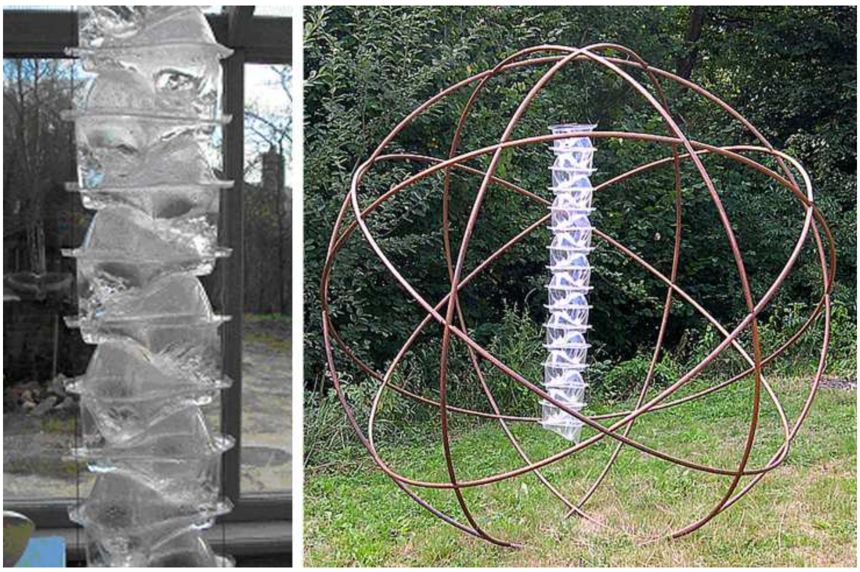
Fig. 41: glasses containing wheat seedlings growing in water samples from different treatments, showing overlaid black size markers using NIH-image software to demonstrate the measurement technique.

Results and Discussion

<u>Set 1: Flowform Cascade inside a Spherical Icosidodecahedron</u>

In two experiments (9 and 10 August 2006), a Laboratory Stackable Flowform Cascade consisting of 16 units was hung inside a copper tube model of a spherical Icosidodecahedron (FID) about 2 meters in diameter to compare effects with a corresponding Flowform cascade (FG, Fig. 42).

Fig. 42: Laboratory Stackable Flowform Cascade (FG, left), and copper model of the spherical Icosidodecahedron (FID, right)



Control treatment (C) was carried out simultaneously by circulating the tap water sample merely through the same make of electrical pump to equalise oxygenation.

The model was constructed and loaned by Tibor Adoryan. We were only able to use it for two days, so we had no control over the timing of the experiments.

Generally, root growth of seedlings is promoted in Flowform treated (FG) water compared to the control samples (Figs. 43, 44, 45 and 46).

In one experiment (9. Aug), the projected polyhedron (FID) still increased the growth enhancing effect of the Flowform (FG) cascade (Figs. 43, 44 and 45).

In contrast, in another experiment (10. Aug) the cascade with the polyhedron (FID) resulted in reduced root growth compared to the Flowform cascade FG. (Fig. 46)

Fig. 43: Wheat seedlings (experiment 9. Aug) after nine days grown in control water (C), water from the stackable Flowform cascade (FG) and from a similar cascade placed inside the polyhedron (FID)

C C C C FG FG FID FID

In total (experiments from 9. and 10. August), water treated with cascade FID resulted in an overall 23.1% increase of mean root length compared to the controls, and the largest difference could be detected in plants treated with water from cascade FG, resulting in an increase in root length of 35.3%. (Fig. 8).

Fig. 44: Pressed wheat seedlings after nine days showing enhancement of root growth in Flowform samples FG and FID compared to controls C (exp. 9 Aug).

Root lengths of the Flowform samples FG and FID are statistically different from the controls on the 0.1% level ($p<0.001$). **Refer 1 below**

Generally, shoot lengths did not display any detectable difference.

Images from capillary analysis show a more vigorous pattern in FG and FID samples compared to controls C, and the middle zone is extended (Fig. 47.

Thus, in all examples, root growth was consistently promoted in **FG** samples compared to controls, whereas the polyhedron had an inhibiting effect in one (10. Aug), and an enhancing effect on root growth in another experiment (9. Aug) with respect to **FG** samples (Figs. 43 to 46). Notably, August 9th 2006 was a day of full moon and, according to the 'Biodynamic Sowing and Planting Calendar', a 'root day' as well (Maria and Matthias Thun 2006).

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1. Statistical significance: A result is called 'statistically significant' if it is unlikely to have occurred by chance. The level of significance α (alpha) gives an indication of the probability that a result could have occurred merely by chance. Popular levels of significance are 5%, 1% and 0.1%. If the P-value is less than the significance level, then the result is considered statistically different. For example, if there is only one chance in a hundred that a result could have happened by coincidence, a 1% level of statistical significance ($P = 0.01$) is being implied. Typically it is asserted that the results are "statistically significant" if a significance test gives a P-value lower than 5% ($P < 0.05$). The smaller the P-value, the more significant the result is considered to be.

Fig. 45: Mean root length in mm (experiment 9. August 2006), **C1** (n=60)**, C2** (n=60) controls, **FG** Laboratory Stackable Flowform Cascade (n=60), **FID** second same cascade inside a copper tube model of a spherical Icosidodecahedron (n=61), **n** number of roots for each treatment, **A, B** data for roots inside individual glasses, bars with standard errors.

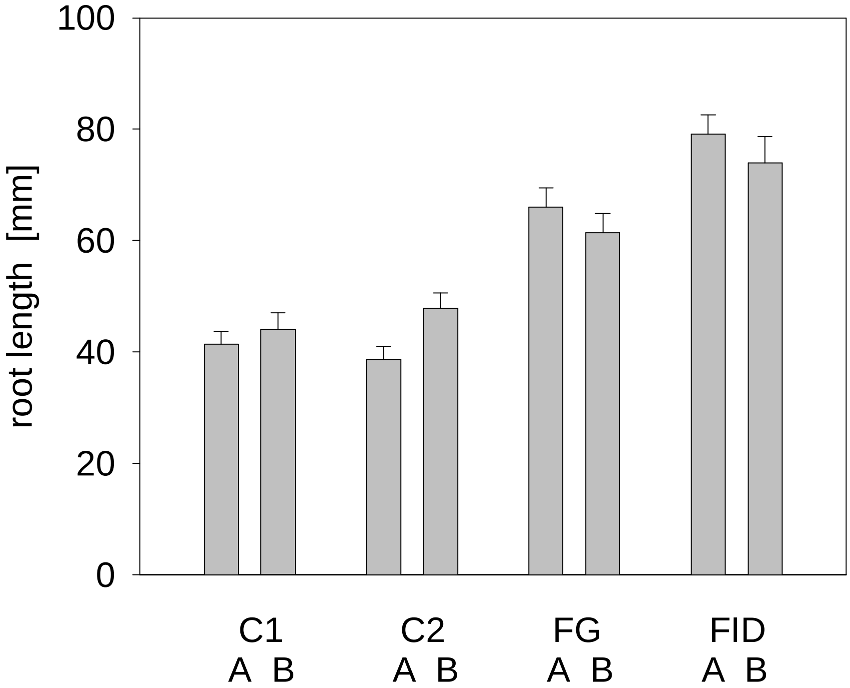


Fig. 46: Experiment 10 August 2006. The conditions had changed. It was no longer a root day and was also considered unfavourable for sowing (Thun Calendar). Moon in perigee moving from Aquarius into Pisces. Due to the rhythmic sensitising of the water these influences are readily taken up by the plants, but not in the control plants.

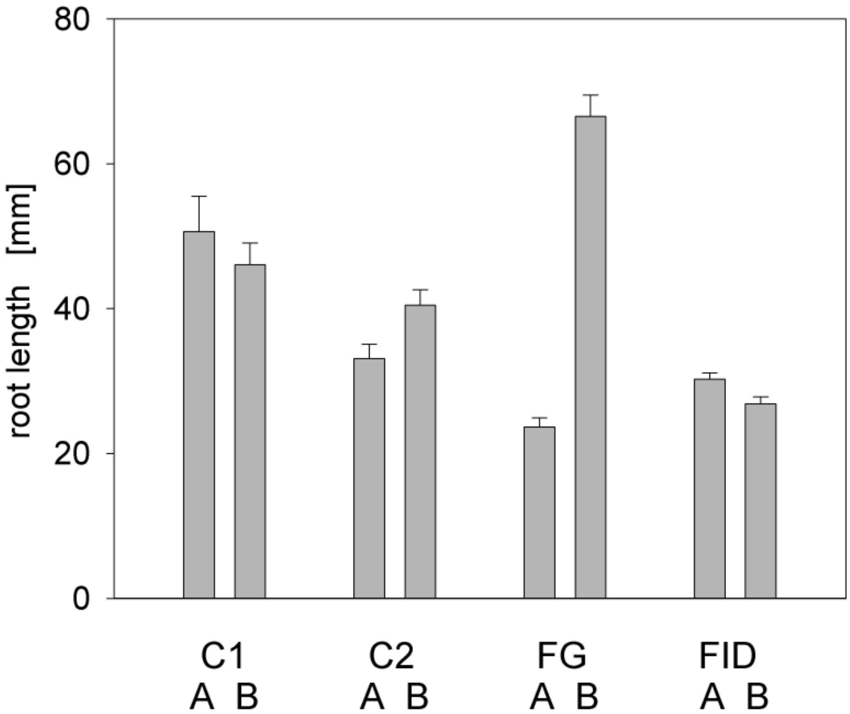
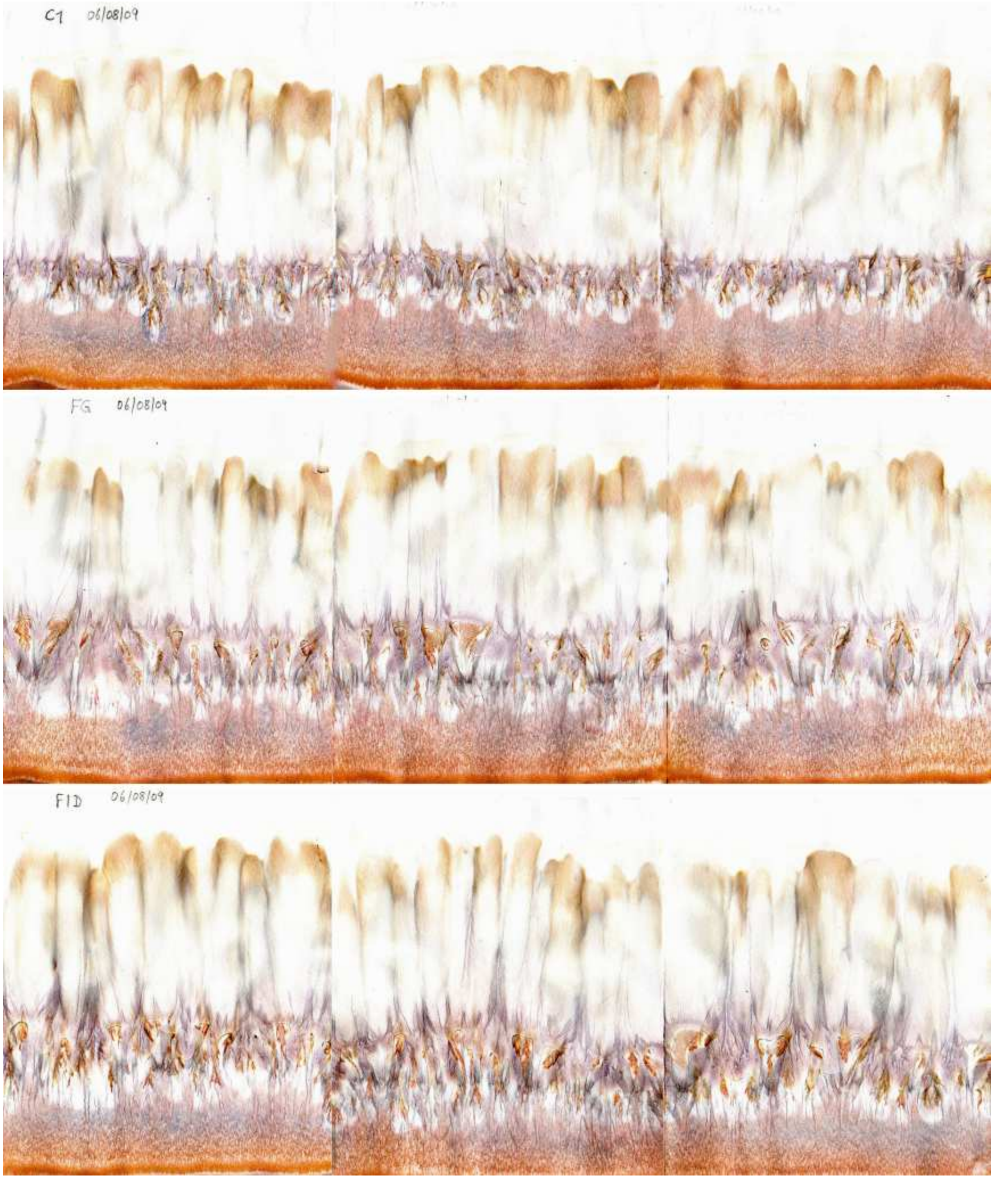


Fig. 47: Capillary images from samples treated on 9th Aug with oxygenated tap water (C, above), with a Laboratory Stackable Flowform Cascade (FG, middle) and with a corresponding stackable Flowform cascade hanging within the Icosidodecahedron (FID, below). All images show a more vigorous pattern in Flowform samples FG and FID compared to the controls C.



When we have the opportunity to carry out extended experiments over a longer period this could be more interesting. Because conditions are constantly changing in nature we can never expect a mere mechanical repetition of results. The results above from the 9th Aug show interesting potential with such treatments.

Set 2: Flowform *Rocker* and other Flowform Cascades inside a Projected Wooden and Bronze Icosahedra

In several experiments (2, 9, 15, 23 May, 25 Sept and 1 Oct 2007), seedlings were grown in water circulated for one hour through a cascade of sixteen Flowform Laboratory Stackable models (**FG**), and through similar cascades placed partly within a projected icosahedron made of bronze rods (**FGIM**), and hanging completely inside a wooden projected icosahedron (**FGIW,** Fig. 48). In two of these experiments (25 Sept and 1 Oct), in addition water also was moved rhythmically in a Flowform Rocker model (Fig. 52 right), without using an electrical pump. Control samples (**C**) were grown in tap water circulated for one hour with a submersible centrifugal pump.

In this set of experiments that stretched out over five months, the variability of results was relatively high.

In some cases (Experiments from May 2 and 9), water from control samples (**C**) and from the cascade inside the metal icosahedron (**FGIM**) resulted in much shorter roots which hardly grew into the water, whereas roots from all other Flowform samples were long, dense and abundant (Fig. 49).

Fig. 48: Flowform cascades from left to right:
Laboratory Stackable Flowform Cascade (**FG)**,
Inside a projected wooden Icosahedron (**FGIW)**,
Partially inside a projected metal Icosahedron **(FGIM)**

In other experiments the differences were much more subtle, as shown in Fig. 50 (Experiment Sept. 25). In one experiment (May 23), the result was reversed in that controls resulted in the longest roots compared to all Flowform treatments.

This raises the distinct idea that in botanical processes subtle influences are at play, and that sensitised water can tend to emphasize such influences.

Fig. 49: Wheat seedlings 20 days after exposure to control water (C), to water from a Laboratory Stackable Flowform cascade (**FG**), and from a similar cascade placed inside a metal (**FGIM**), and a wooden projected Icosahedron (**FGIW**). (Experiment May 9)

C C FGIM FGIM FGIW FGIW FG FG

Through our experiments over a longer period of time we can experience that rhythmical processes generated through Flowform activity have a sensitising effect upon the water.

In many of the tests carried out the water may be more readily influenced by the growth-inhibiting or growth-enhancing influences of the existing environment at that time.

Again this indicates that we need to become much more aware of when we should carry out planting and harvesting activities.

Fig. 50: Wheat seedlings 13 days after exposure to control water (**C**), to water treated with a Laboratory Stackable Flowform cascade (**FG**), and from a similar cascade placed inside a metal (**FGIM**), and a wooden projected Icosahedron (**FGIW**). **FR** treated with Rocker Flowform. (Exp. Sept. 25)

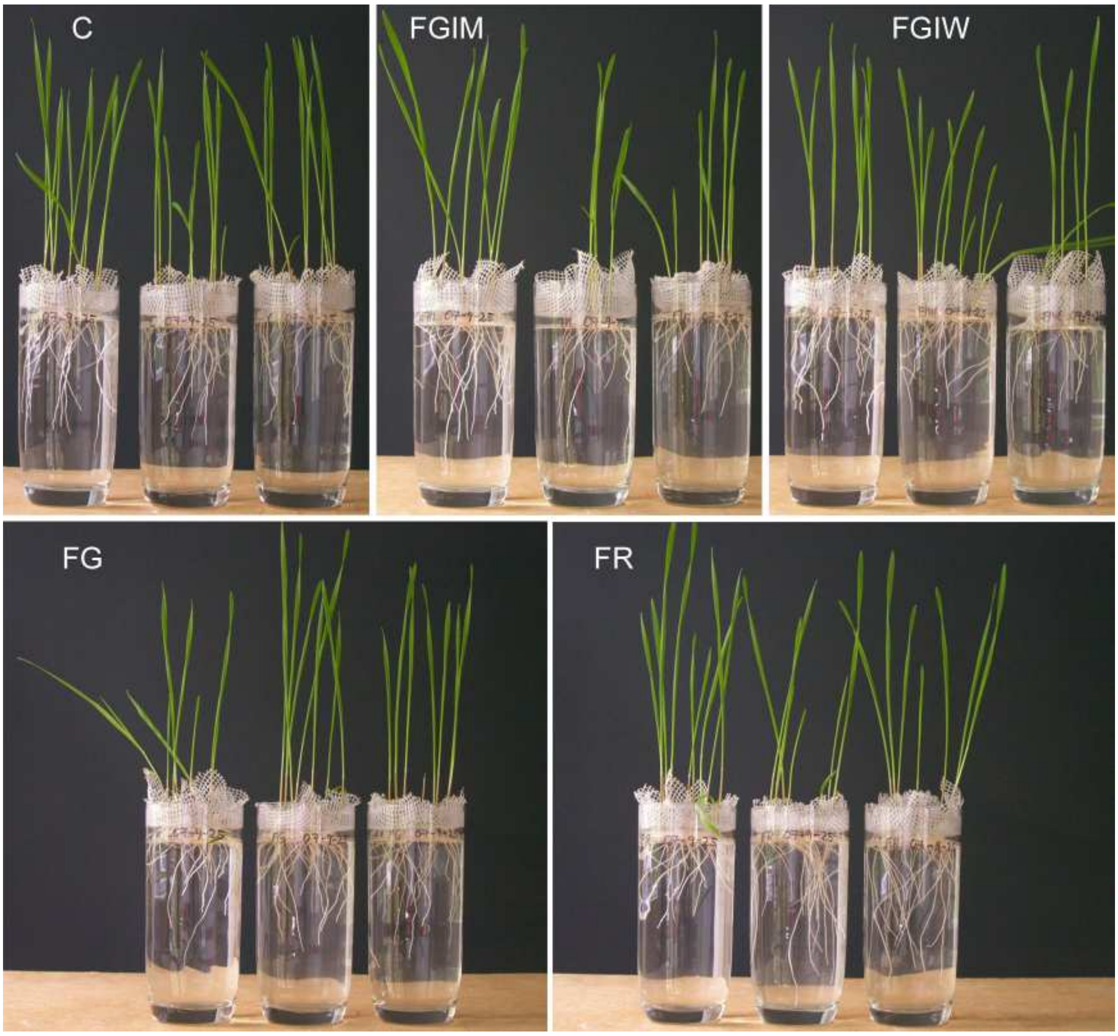


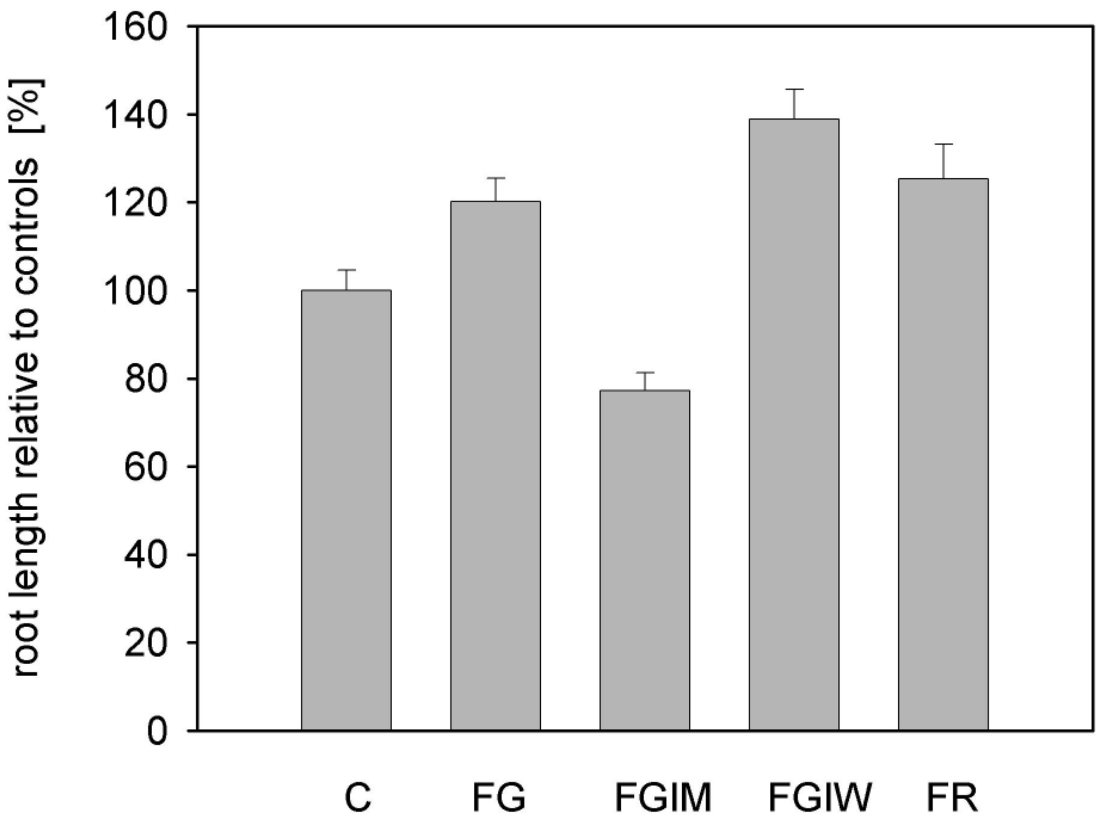
Fig. 51 below shows the mean values of all experiments.

Root growth was enhanced by 38.8% in the seedlings treated with water from cascades with the wooden icosahedron (**FGIW**), by 20.1% from the Laboratory Stackable Cascade (**FG**) and by 25.3% from the Rocker Flowform **(FR).**

However, root growth of **FGIM** treated plants (bronze icosahedron) was inhibited by 22.7% with respect to the controls.

All samples are statistically different from controls on the 1% ($P<0.01$) level (Fig. 51 below). Generally, shoot lengths did not show any detectable difference.

Fig. 51: Mean root length in % with respect to control treatments (**C** =100%, n=284), **FG** cascades of 16 Laboratory Flowforms (n=260), **FGIW** similar cascade of 16 forms inside a projected wooden Icosahedron (n=279), and C**GIM** partially inside a projected metal Icosahedron (n=219), **FR** rocker Flowform (n=84), bars with standard errors, **n** number of roots per sample.



Set 3: Flowform Vortex Cascade inside a Bronze Icosahedron, and a Cascade of 38 Flowform Stackable Vessels

In several experiments (6 and 7 January 2005) the following samples were compared:

1. **Control C** was tap water moved through a pump for one hour and allowed to fall into itself to create turbulence and oxygenate. Samples were collected from the pump outlet.

2. **FW** cascade consisting of 38 units of the stackable Flowform Laboratory model through which water from the mains hose was

allowed to flow through, once only (see Fig. 28 right). Samples were collected directly into glasses from the cascade.

3. **FJI** cascade consisting of 16 Flowform Laboratory models hung partly within a projected icosahedron made of bronze rods. The elliptical projection is 100 cm high and the cascade 150 cm high. Water was circulated for an hour by a centrifugal pump at 6 lt/min. Samples were taken directly into glasses from the cascade (see**,** Fig. 28 middle).

4. **FV** cascade consisting of five Flowform Vortex vessels above a 2000 lt. tank (Fig. 52 left). Water was circulated for one hour at 200 lt/min using an in-line Hidrostal helical screw pump. Samples were taken directly into glasses from the cascade outlet.

Fig. 52: The Flowform Vortex (FV, left) and the Flowform Rocker (FR, right)

Generally, root lengths of plants in different glasses of the same treatment were comparatively similar (Fig. 53).

In this set of experiments, Flowform treatment resulted in a dramatic increase in root lengths. Root lengths of plants grown in water treated with the Flowform Vortex **(FV)** increased by 307% compared to the controls. The cascade within a projected icosahedron (**FJI**) led to an increase of 112%, and the cascade (**FW**) promoted root growth by 48% (Fig. 54).

However, since the water used for the Flowform Vortex cascade was taken from the tap earlier than for the other samples and stored in a large open container, the results of the Flowform Vortex cascade have to be considered with reservation and need to be repeated to come to conclusive results.

All samples in Fig. 54 are statistically different from controls at the 0.1% ($P<0.001$) level.

To summarise, in most experiments with wheat seedlings, root but not shoot growth was promoted when grown in Flowform water. An exception was the water from the metal (bronze) icosahedron, which inhibited root growth.

Promotion of growth was always statistically significant on the 5% level (in some cases also on the 1% or 0.1% level).

Generally, the variability of results in single experiments was relatively high, which could be an expression of seasonal and/or cosmic influences.

All the experiments need to be conducted over extended time periods and could be related to planetary phases to be able to make a statement about whether certain periods of enhancement or inhibition of root growth exist.

Fig. 53: Mean root length in mm, left: Experiment 7. Jan, three replicas (glasses), right: Experiment 6. Jan, two replicas for each sample, each bar represents mean root length in a single glass, **C** control, **FW** cascade of 38 Laboratory Flowforms, **FJI** cascade of 16 Laboratory Flowforms partially inside a projected metal icosahedron, **FV** the Flowform Vortex, bars with standard errors

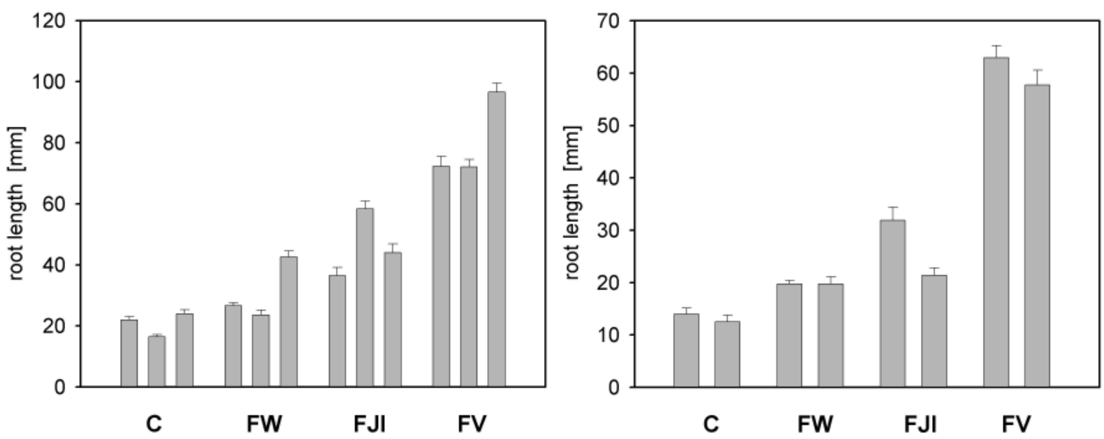
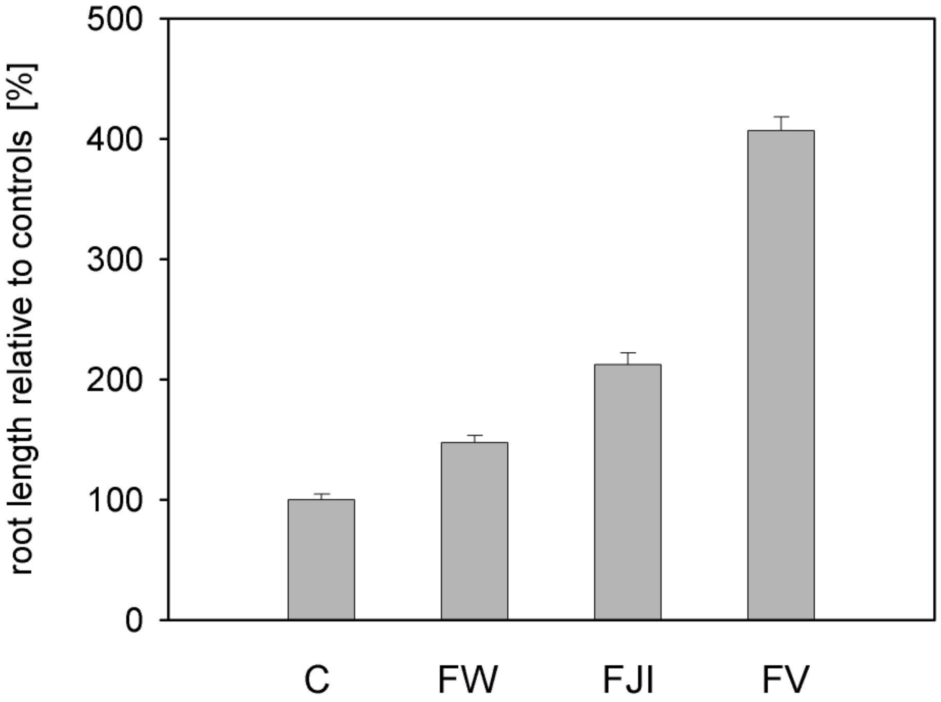


Fig. 54: Mean root length in % with respect to control treatments (**C**=100%, n=76), **FW** cascade of 38 Flowform Laboratory units (n=121), **FJI** cascade of 16 Flowform Laboratory units partially inside a projected metal Icosahedron (n=127), **FV** the Flowform Vortex cascade (n=139), bars with standard errors, **n** number of roots in each sample



Research for the Near Future

The Healing Water Institute has established connections with more than thirty countries, and is established as coordinated legal entities in England, New Zealand and the USA. At present there are active connections with twenty of countries relating to a wide variety of projects, practical, scientific and artistic.

Funding for research and vital administrative planning and coordination is being sought for the Institute in England as well as in New Zealand. The Healing Water Institute in the USA is focussing primarily on educational aims, but is able to fundraise on behalf.

Further projects are planned related to the following areas of research and practical application:

- We need to establish more advanced test systems to further examine the effects of Flowform technology on water quality. The Institute has already conducted experiments with plants that can easily be grown under controlled conditions (such as cress, wheat, etc.), which enabled us to test examine the effects of Flowform water on growth and vigour.

- We need to further analyse and repeat our plant experiments with cress (Exp 1) and wheat (Exp 3) seedlings, as well as lettuce plants (Exp 2). These have already shown that there is a significant effect of Flowform treated water on the vigour and growth rates of different plants.

- We need to investigate the influence of lunar and planetary phases with regard to different Flowform cascades and geometric envelopes. There is much data available and this needs analysis according to experimental dates. Because organic phenomena operate according to life rhythms (unlike inorganic matter) we need to see what rhythms are influencing our experiments.

- - We will use the Capillary Method, Crystallisation and Drop Picture techniques, in connection with quantitative analysis, to determine the effects of different rhythmical treatments and different Flowform design types.

- The Drop Picture Method is currently set up at the Institute to be used as a complementary qualitative method for the analysis of water quality.

- Capillary and Crystallisation tests are already routinely used at the Institute to characterise water in relation to its life supporting influence and to investigate the effects of Flowform treatments. We want to carry this work much further and learn how to read and interpret in more detail the crystallisation and capillary images, so that reliable statements can be made about the qualities of the different water samples and their effect upon plant growth.

- We want to examine how polyhedra of different designs and materials might influence have an enhancing effect upon the Flowform sensitising rhythmical function. We have started conducting experiments testing plant growth with Flowform water from cascades inside several projected polyhedra (see Fig. 28 and Fig. 48).

- Micro-organisms' biological responses to Flowform water is important to add to our research, especially regarding effluent treatment.

- We also intend to further develop the Virbela Screw in relation to water lifting applications, for example for biodynamic preparations. The leading concept of this project in process is to transport water upwards in an Archimedean manner via an open spiraling channel in such a way that it is passing over path-curve surfaces in an expanding and contracting path through left- and right-handed vortices. This lifting technique allows a treatment process in a small space without the negative influences of conventional pumping or electromagnetic polluting frequencies.

- We will investigate the effects of the Flowform *Rocker* design on water. This is a single form consisting of four cavities in a symmetrical arrangement, able to apply a rhythmical treatment on a smaller scale without using electrical pumps.

- The pioneering path-curve geometrical research of George Adams and Lawrence Edwards needs to be carried further. We want to investigate moving water over path-curve surfaces by further including such surfaces into Flowform vessels.

- Flowform rhythmical treatment of various agricultural fertilisers, including compost teas and the catalytic biodynamic preparations need more investigation on top of existing positive results both in the laboratory and in the field.

- Flowform influences in aquaculture and horticulture will be studied in practical situations preparing more exact hypotheses for future experimentation.

- Flowform designs ideally suit fish passes, and prototyping work in New Zealand needs continuing, placed in working installations.

The work of the Healing Water Institute is unique as it not only researches the life supporting, energetic capacities of water amongst other water issues, but it is also further developing its proprietary Flowform™ and other new eco-technologies to practically help water support life, at a time when water is struggling to continue the role it has played for eons enlivening nature.

In addition to these design research tasks the Healing Water Institute also engages in educational activities bringing an understanding of the creative secrets of water to people combined with the absolute necessity to act to help it.

Our intention is to build up the activities and influence of the Healing Water Institute internationally, from our bases in England, New Zealand and the USA with the sole aim of helping water and through it human communities and nature.