Observations on the effect to cut flowers by alkaline reduction water, produced using magnetic bipolar bisque fired ceramic balls:

(with a 20mV difference between the magnetic poles).

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It has been posited that hydrogen plasma ($H_2 \Leftrightarrow H^+ + H^-$) can be induced under a high heat, oxygen free, reduction environment. Our laboratory has undertaken a study to examine the potential of inducing a plasma reaction in water using magnetic bipolar bisque fired ceramic balls. (fig. 1)

Fig. 1 Magnetic bipolar bisque fired ceramic balls.

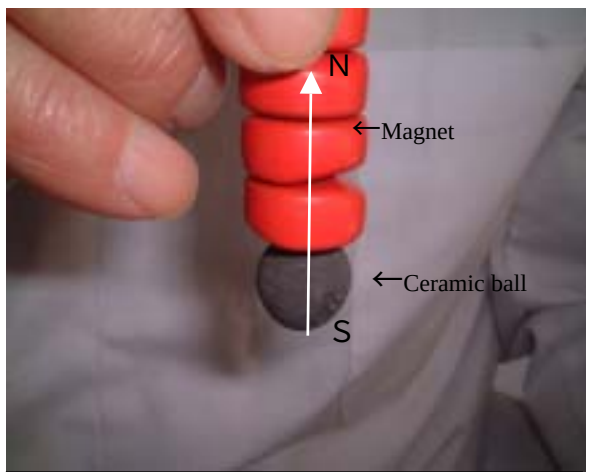


Fig. 2 The black ceramic ball showing its attraction to the red magnet.

Fig. 3 The ceramic ball immersed in water showing the production of hydrogen bubbles.

Properties of the ceramic balls

- Bisque fired (unglazed), allowing water to easily permeate
- The balls have a 20mV potential difference between the poles (fig. 2)
- When exposed to water the balls release hydrogen gas from the North pole (fig. 3)

※ Results verified by Dr. Tamayo Kojima, PhD at Niigata TLO Ltd using an EMF type hydrogen sensor.

※EMF hydrogen sensor – Niigata University Engineering Department, Harada & Suda, Hyoumen gijutsu shi. Vol. 57. No. 3, 2006

After the ceramic balls are exposed to water the pH and ORP stabilizes (see figs. 4, 5 & 6).

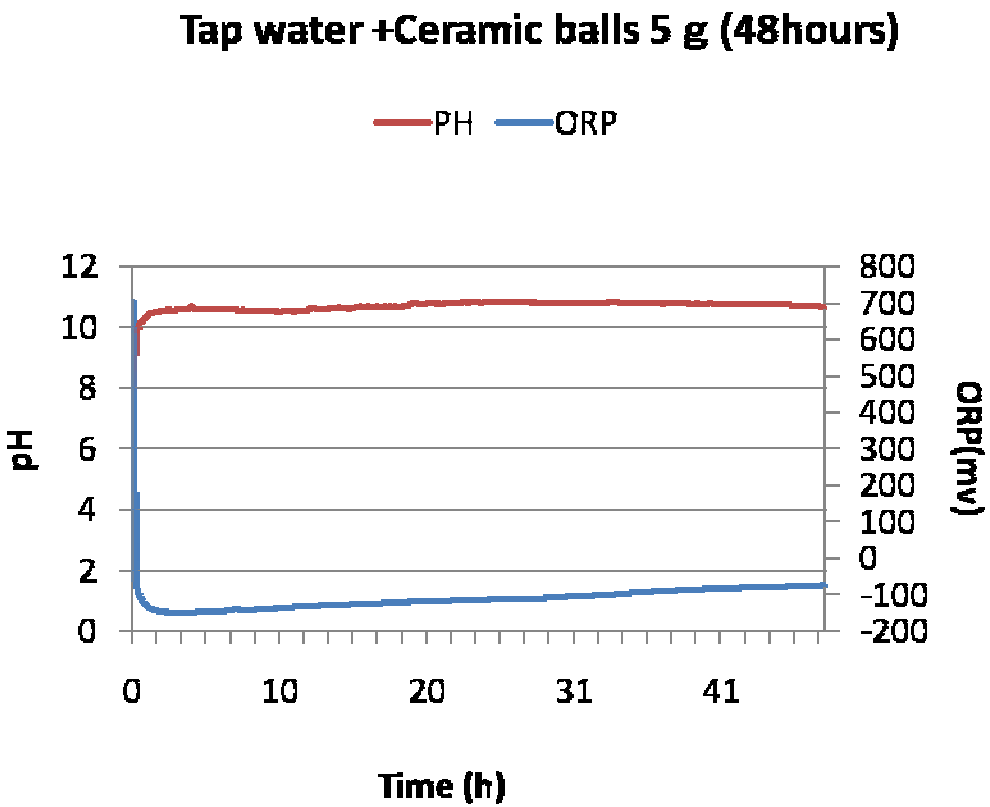


Fig. 4

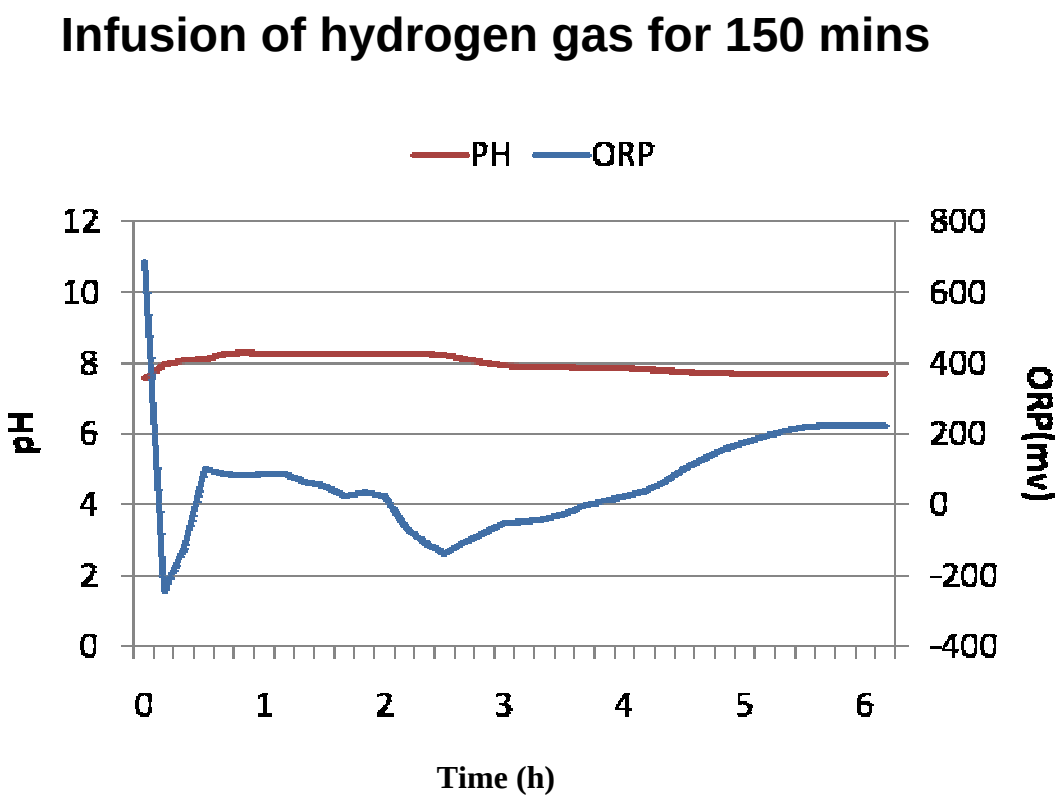

Infusion of hydrogen gas for 150 mins
PH
ORP
12
10
8
6
4
2
0
800
600
400
200
0
-200
-400
pH
ORP(mv)
0
1
2
3
4
5
6
Time (h)

Fig. 5

Hydrogen gas added to a solution of tap water and ceramic balls (as in fig 4)

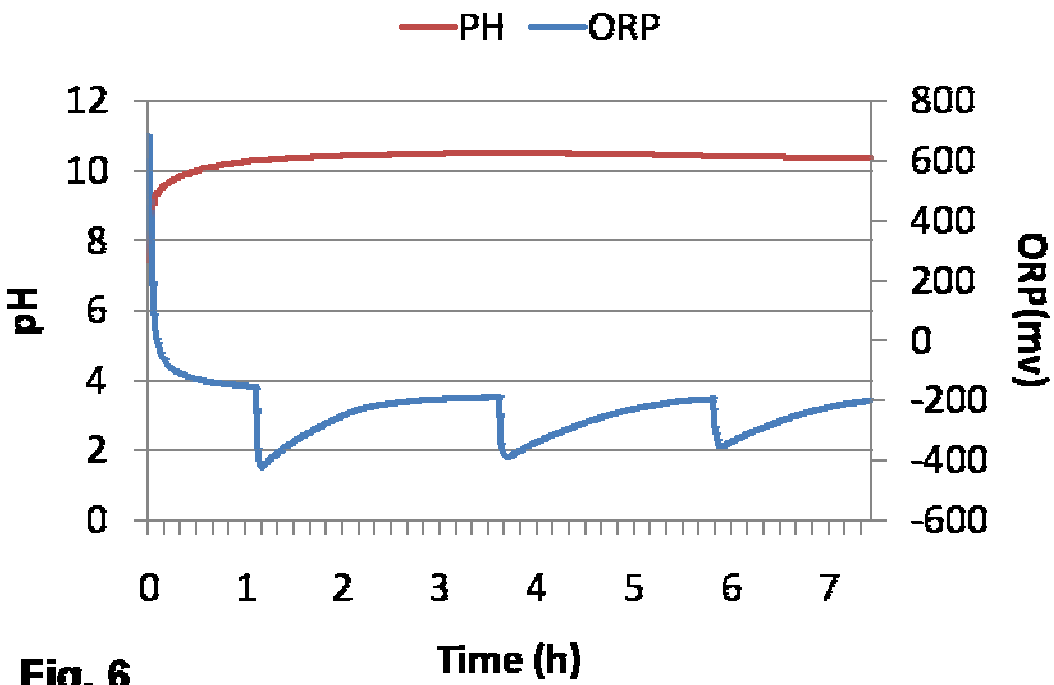


Fig. 6

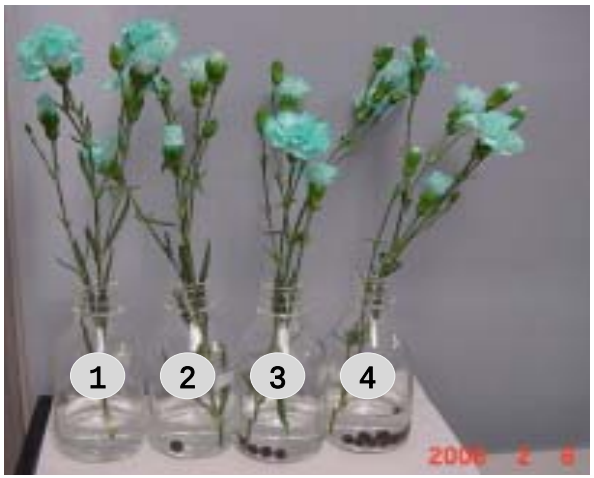
Hydrogen gas is released for the first 10 – 15 minutes. The surrounding water reaches and stabilizes at a level of about pH10 and the ORP at –250mV (fig. 4). The water will maintain a weak alkali and the ORP state at the minus level for at least 24 hours.

Vast amounts of hydrogen gas can be dissolved in water in this condition, which extends the time of the water's stability (fig. 6). We have made observations of how this phenomenon affects plants and can now describe some fascinating effects not reported in previous studies.

1. Growth of cut flowers

- Carnations①

The plants have small buds at the start of the experiment, which continue to grow and bloom large.



First day of experiment.

The development of cut carnations in 200ml of tap water with different numbers of ceramic balls.

①Tap water only (control)

②Tap water with 1 ceramic ball.

③Tap water with 5 ceramic balls.

④Tap water with 10 ceramic balls.

21st day of the experiment

The flowers in only tap water begin to die while the buds in water with ceramic balls grow bigger and bloom.

1. Growth of cut flowers

- Carnations②

Growing gradually, new flower buds appear and bloom within 4 months.

The carnations were placed into 200ml of tap water with 0.65g of ceramic balls.

The photos above show the development of a small bud, with it blooming after 83 days.

Start of the experiment. (2007.2.15)

35th day of the experiment. 2 flowers are still in bloom. (2007.3.22)

69th day of the experiment The small bud starts to swell. (2007.4.25)

118th day of the experiment. The small bud has bloomed and a new bud begins to appear. (2007.6.13)

1. Growth of cut flowers

- Small roses

Cut roses grow rapidly and bloom new flowers.

Start of the experiment.
(2007.7.24)

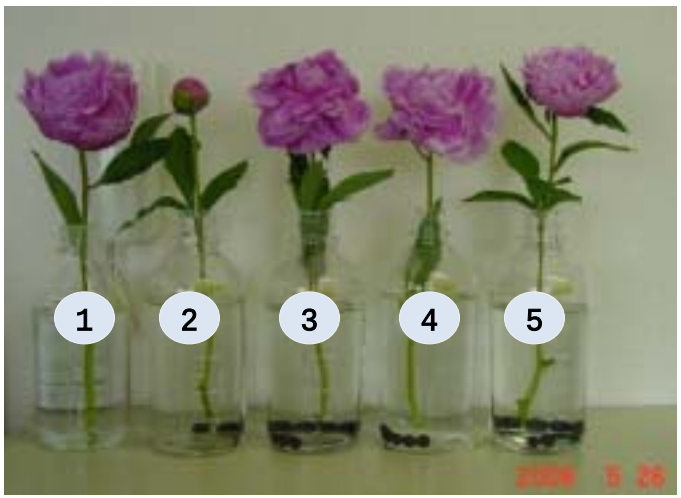
Cut roses were placed in 200ml of tap water with 0.65g of ceramic balls.

The 101st day of the experiment. The plant grows and new roses begin to bloom. (2007.11.2)

2. Controlling flower growth

- Chinese Peony

The ability to manage flower growth is dependent on the number of ceramic balls in the water.



Cut chinese peonies were placed into 200ml of tap water with different numbers of ceramic balls.

①Tap water only (control)
②Tap water + 2 ceramic balls
③Tap water + 10 ceramic balls
④Tap water + 5 ceramic balls
⑤Tap water + 15 ceramic balls

In ② above, the plant is given only 2 balls and thus maintains its condition without blooming. The other flowers all bloom in the expected time period.

3. The impact on withering

- Chinese peony

The flower with the most amount of balls starts to wither from the joint on the second day of the experiment.

Cut chinese peonies were placed into 200ml of tap water with different numbers of ceramic balls.

① Tap water + ceramic balls 0.1g
② Tap water + ceramic balls 0.15g
③ Tap water + ceramic balls 0.2g
④ Tap water + ceramic balls 0.25g
⑤ Tap water + ceramic balls 0.3g
⑥ Tap water + ceramic balls 0.35g

Start of the experiment. 2007.6.4

After 2 days. 2007.6.6

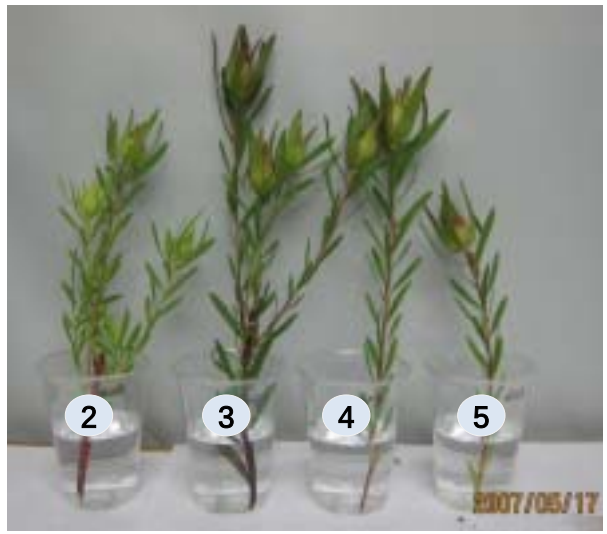
Flower ⑥ starting to wither after 2 days.

After 7 days, flower ⑥ has clearly withered. 2007.6.11

4.Extending plant life (for about 9 months)

- Leucadendron

Plants moved from reduction water to tap water after 60 mins.



①Tap water only (control)
②Tap water with 0.2g of ceramic balls.

③Tap water with 0.4g of ceramic balls.
④Tap water with 0.6g of ceramic balls.
⑤Tap water with 0.8g of ceramic balls.

Experiment started 2007.5.17.
The plants were left in the reduction water, at different concentrations, with 2% red food dye for 60 minutes. The plants were then transferred to containers with plain tap water.

Extending plant life

(plants still living beyond 9 months)

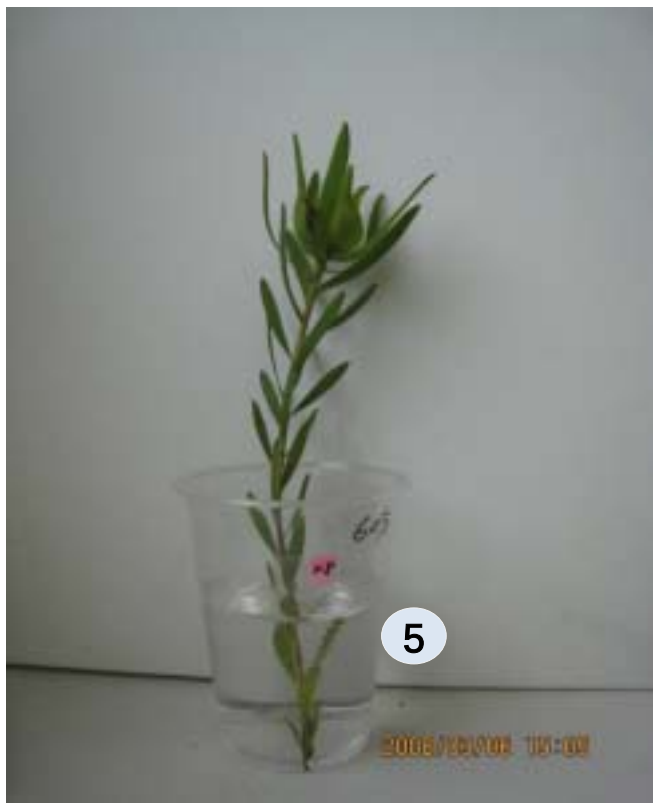
- Callus and root formation

There is clear callus and root formation and the leaves remain the same as they were at the start of the experiment.

The 294th day of the experiment. (9 months) 2008.3.6

The cut area of the stem remains the same as it was at the start of the experiment.

Water quality is maintained for 9 months
(the water was not changed)



5. The appearance of several lateral buds

- Pompon chrysanthemum

Lateral buds begin to appear five days after the start of the experiment. 35 days later, 12 flower buds appear and 55 days later there are 30 flower buds.

Start of the experiment (2007.1.10)

35 days after starting the experiment. No change. (2007.2.4)

Tap water only (control)

Start of the experiment (2007.1.17)

35 days after starting the experiment. 12 flower buds. (2007.2.21)

55 days after starting the experiment. 30 flower buds. (2007.3.12)

Tap water + ceramic balls 0.66g

6. Plant circulation

- Chrysanthemums immersed in red food dye

  The chrysanthemums drawing up the red food dye to the flower soon wither.

Start of the experiment.
2007.2.5

On the 24th day of the experiment.
2007.3.1

①Tap water only (control)
②Tap water with 0.2g of ceramic balls.
③Tap water with 0.4g of ceramic balls.
④Tap water with 0.65g of ceramic balls.
⑤Tap water with 0.8g of ceramic balls.
⑥Tap water with 1.0g of ceramic balls.

6. Plant circulation

- Artificially dyed sweet peas

The artificial dye absorbed by the sweet peas is drawn out of the flower immersed with the ceramic balls.

Start of the experiment.

24 hours later

24 hours later the dye comes out only into the reduction water.

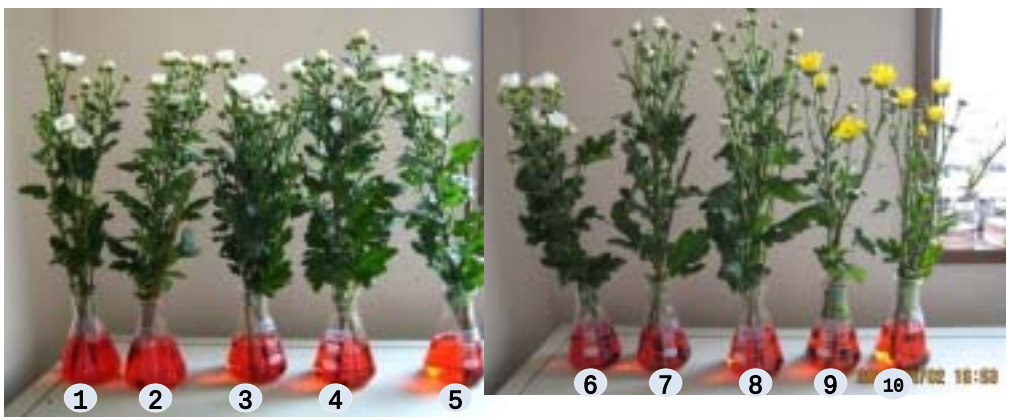
Cut sweet peas were placed in 200ml of tap water with ceramic balls.
① Tap water only (control)
② Tap water + 10 ceramic balls

6. Plant circulation

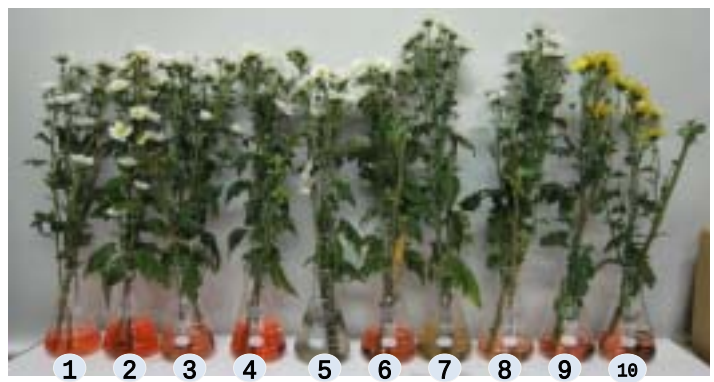
- Chrysanthemums immersed in red food dye

  Only 1 plant completely draws up the red food dye. The water level is also maintained.

Cut chrysanthemums were placed into 200ml of tap water with different concentrations of ceramic balls.
① Tap water only (control)
②～⑩ Ceramic balls were placed in the water at 0.2g increments for each flower.



Start of the experiment. 2007.5.2



The 15th day of the experiment. 2007.5.17
Only plant ⑤ draws in the red food dye.

7.Hydroponics

- Phalaenopsis

A phalaenopsis seedling with its roots cut, grows, develops flower buds and finally blooms.

Start of the experiment.
2007.7.24

After 232 days
2008.3.12

The phalaenopsis had its roots cut short. The remaining plant was then placed in 200ml of tap water with 0.9g of ceramic balls.

[redacted]

Start of the experimen
2007.7.20

On the 47th day of the experiment a bud developed.

The stem continued to grow and by the 213th day a flower bloomed. It remained in bloom for 3 months.(2008.2.18)

[redacted]

7.Hydroponics

- Snap dragon

A snap dragon seedling placed in water with the ceramic balls experiences accelerated growth, including greater root mass.

After 63 days

8.Experiments on rose regrowth ①

Calluses can be easily formed.

Start of the experiment. The same condition can be maintained for over half a year.

Calluses are also formed at the leaf

② The progress of rose regrowth

Start of the experiment. 2006.6.22
Cut roses were placed in 1000ml of tap water with 10 ceramic balls.

The flowers were cut and a week later a callus begins to form.

167 days after starting the experiment the roses were planted in pots. 2006.12.5

A flower blooms 75 days after being planted. 2007.2.28

Another flower blooms 131 days after being planted. 2006.4.2 (2nd flower)

The rose is planted in the ground. 2007.9.3 Another flower blooms. (3rd flower)

The flowers bloomed regardless of the season.

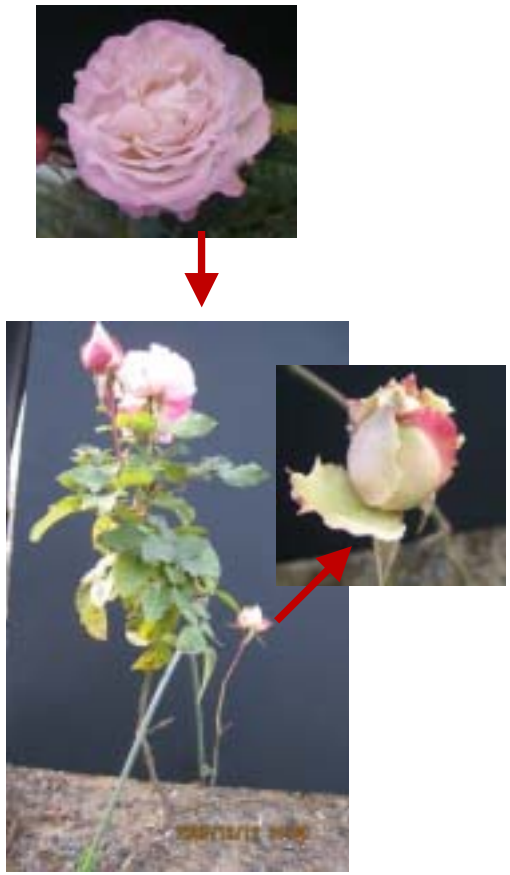
Rose regrowth ③

- Each time a rose blooms a different rose flower appears.

Start of the experiment.
2006.6.22

One year later the rose was planted in the ground.
2007.6.27

68 days after being planted. Each new flower is completely different to the ones that grew before. 2007.9.3



100 days after being planted, more new flower buds appear and bloom. 2007.12.12
Flowers continue to bloom in different colors and shapes.

Conclusion

• The results presented here are preliminary investigations into the biological phenomena created by ceramic ball generated reduction water. More research is required to understand the mechanisms causing these phenomena.