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Tiny Bubbles Help Flower Growers in the Hot Summer



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Since 2017, the manufacturer of the Solari Nanobubble Generator has been active in Japan with flower growers to increase flower production both in volume and quality.

The first year of cooperation with the growers, trials were set up to build up know-how for both parties. It was quickly learned in the first season that the technology worked well. So much so that the growers decided to stop the trial on individual crops and instead apply the nano bubble irrigation water to the whole greenhouse.

In 2018 more growers in Aichi District opted for the Solari Submersible Nanobubble Generator coupled with the Oxygen Concentrator and in 2019 more growers were lining up to start applying the ultrafine bubbles. Some growers now use multiple machines for their multiple greenhouses. One of the reasons the submersible ultrafine bubble units are so popular is that the investment is low and the return on investment for the small greenhouses in Japan works out.



The trials were done with carnation growers in Aichi, Japan. Aichi is the third largest growing area of Japan. Planting first week of July 2017, usually the first flush of flowers is between November and December. The area is very hot in the period of July through September with a daily average temperature of 33°C (92°F) and humidity of well over 80%. This makes a greenhouse climate not very comfortable for the crop nor pleasant for a grower to work in.

One of the tests was done in a greenhouse of 1500m² with 10 carnation varieties including Viper Wine, Kleos, Vogue, Hurricane, Moonlight, Tico, Tico Violet, Nobbio, Cabaret, Master, Ormea, and Cotton Candy.

Results are shown and explained below. This is in carnation growers, however, all research shows that all plants have a positive effect to the introduction of nanobubbles and additional oxygen into the root zone, so this is not isolated to flowers – but also vegetables, herbs, and so on also have a similar benefit.



The dissolved oxygen (DO) levels were increased from 4 ppm to 30 ppm by recirculating the irrigation water through the Submersible Ultra-Fine Bubble Generator that connects to an Oxygen Concentrator.

The Oxygen Concentrator produces over 6 lpm (1.3 GPM) of O₂ with a purity of more than 92%. The growers use a day storage tank of 30m³ (6,600 gallons) which required 4 hours to bring the DO up to 30 ppm and inject billions of ultrafine bubbles in the water. The ultrafine bubbles have an average size of 110 nm, which is smaller than a cell, so the nanobubbles are easily absorbed by the plant roots cells. All the other cultivation practices stayed the same.

The tests showed good results on stem quality, size of flower, shoot count, volume of the stems and growth speed. One of the growers also reported a **65% decrease** in fertilizer used and the ability to ship out the first stems at a more than average length.





Besides the above improvements with nano bubble irrigation water: also, problems of withering and dying plants stopped. These results gave a very positive outlook on the nano bubble generator with oxygen concentrator, and now the ultrafine bubble units are not only installed in carnation nurseries but also in gerbera's and lisianthus greenhouses.

The ultrafine (nanobubble) bubble irrigation water improves soil and crop significantly in areas that were planted repeatedly with the same crop. In areas of the greenhouse prone to fusarium the oxygen rich water removed fusarium problems completely as the natural soil bacteria thrive well in an oxygen rich environment while the fusarium thrives in oxygen poor conditions. Tests are currently at rose growers, chrysanthemum growers and bouvardia growers and all are convinced it will have similar results.

Apart from flower cultivation the Solari Ultrafine Bubble Generators are also successfully used in tomato, bell pepper, lettuce and cucumber production. The product has proven its value in better harvest results.



Solari Submersible Ultrafine Bubble generator in irrigation tank at greenhouse site.



CONTACT INFORMATION

Phone: +61 7 3118 5927

Fax: +61 7 3283 2001

Email: info@solariwater.com.au

Mail: 477 Boundary Street
Spring Hill QLD 4000 Australia

Web: www.solariwater.com.au

