

A brief history of directional air sprayers featuring the Quantum Mist™ Spray Head

The wine industry in Australia and New Zealand has grown exponentially in the last 15 years. Along with any rapid growth comes the need for practices to keep pace with the demand. In the area of spray application equipment the Quantum Mist™ axial spray head, developed by SARDI, New Zealand Orchardist George Eady, and now exclusively sold by sprayer manufacturer, Croplands Equipment, has benefited from this growth while achieving efficiencies for growers. A brief history of the development of this world-class technology follows below.

One of the key elements of any successful vineyard is the application of crop protection products to keep the vines free of disease and pests. Whether it's organic or synthetic material being applied, the method of application is usually the same. The active chemical is mixed with water as a carrier and applied to the vines using spray droplets, normally air-assisted with force, from an axial or centrifugal fan source.

In the 1990's the wine industry expanded rapidly and manufacturers of spraying equipment, along with research bodies, searched for ways to increase the efficiency of spray application to keep pace with the growing market.

On both sides of the Tasman, work was underway to develop directional air sprayers. In New Zealand, an experienced orchardist by the name of George Eady started the development of a product called the Quantum Mist™. Simultaneously in Australia, Geoff Furness, a researcher with the South Australian Research and Development Institute (SARDI) was developing a similar product called the Hydra Head.

Croplands recognised the potential for directional air application in grapes using the axial fan technology and began to commercially manufacture and distribute the Quantum Mist™.

The spray head's true market commercialisation cycle began in grapes in Marlborough in the mid 1990's. In 1998 it was launched in Australia. Even from its commercial conception it became clear that directed air axial-fan technology could provide increased efficiency for grape growers in terms of better spray coverage, faster travel speeds, energy savings, outstanding reliability, and minimal drift potential. The ability to spray large areas of vines economically and effectively was just what the market needed.



The Quantum Mist™ spray head as seen today.

SARDI was finding it difficult to make the Hydra Head a commercial proposition, so in 2002 Geoff Furness headed up the development of a new fan to improve the performance of the Quantum Mist™ spray head. This SARDI fan, a 5-blade one-piece design, was a major step forward in the development of the Quantum Mist™. Using the newly developed fan the Quantum Mist™ spray head achieved more effective coverage, at lower fan RPM, giving rise to multi-row sprayers able to cover much more area than single row machines. Today, Croplands produce a 3-row machine for larger vineyards. Machines that can spray up to six rows have also been produced, as can be seen in the picture below.



6-row Quantum Mist™ developed for the US market.

In 2004 a new cowl design was also introduced to incorporate the nozzle spray-ring inside the cowl. This ring was made larger in diameter to assist with achieving higher liquid application rates if required. The nozzles were also recessed slightly to avoid the potential for them to 'catch' on the canopy during late season spraying operations. Slight improvements in airflow were also noted from the new cowl design.

During the development of the Quantum Mist™ trials were conducted on the fans using fluorescent dye as a marker for measuring droplet deposition on the leaf and bunches of the vines tested. The first trial conducted was carried out in a sprawl canopy vine type. A year later another trial was undertaken in VSP canopy grapes. The results from both trials, conducted by Geoff Furness, were published by SARDI and hardcopy reports are available by contacting Croplands.

In his most recent report in VSP canopy (Test report #2) Furness provides an easy-to-follow pictorial evaluation of the excellent coverage achieved showing the deposition of droplets on various quadrants of the canopy as well as the droplet deposition on bunches.

On going development is needed to ensure the Quantum Mist™ stays ahead of the game. The most recent development hasn't focused on the fan itself, although subtle design improvements in the last two years have made it even more efficient and robust. Instead, emphasis has been placed on the chemicals applied using the spray head with application specialist, Jorg Kitt, joining Croplands' in a joint partnership with parent company, Nufarm, in 2006 to assist with this project.

Jorg's chemical experience and technical skills, originating from an academic background in science, and has provided the project with a new direction. Recently he introduced the super spreader, DuWett, to the Quantum Mist™ equation. This new step is possibly the most important in the on-going development of the Quantum Mist™. Trials in grapes using DuWett have yielded extremely impressive results. Testing has proven that water rates in larger canopies are reduced significantly, travel speeds can be increased (especially in early season), and coverage is improved dramatically.



"Why wouldn't every grower want to halve his water application rate, improve his crop protection, and travel across his vineyard faster?" says Jorg Kitt, Application Specialist, Croplands/Nufarm.

In a short time Quantum Mist™ technology has developed rapidly, changing the way vineyards, and now orchards, are sprayed. Croplands have expanded their sprayer range, capitalising on the success of the Quantum Mist™ fan, to manufacture sprayers designed specifically for apples, citrus and kiwifruit.

Croplands Equipment has been in the business of manufacturing Spraying Equipment since 1972. Since becoming part of Nufarm in 1988, the growth of Croplands' range of equipment has been impressive. Today, Croplands manufacture and distribute equipment suitable for all the major market sectors requiring crop protection including broadacre and horticulture.

In New Zealand and Australia Croplands' name is synonymous with orchard and vineyard sprayers. They have an enviable reputation for innovation, reliability and excellent distribution through their hand picked dealer network. The development of the Quantum Mist™ range of horticultural sprayers in particular means the future looks bright for Croplands, with growing international interest leading the way for expansion into the European, South African and US markets.

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The popular Quantum Mist™ two row sprayer.