

WG19/111 BotryZen

Band – IN THE VINEYARD

BOTRY-Zen® & ARMOUR-Zen®

products whose time has come

Terry Dunleavy

BOTRY-Zen® and ARMOUR-Zen® are products whose time has arrived, a fact that appears not to have been fully grasped by our industry.

Underlying the present myths about “food miles” being promoted by self-protective producers in UK and Europe who see the “carbon bubble” hysteria as a potential non-tariff barrier against competing products from New World and African countries, is a genuine consumer desire to be seen to be supporting products that meet the test of “sustainability”. Concepts like “food miles” and “carbon footprints” will soon pass into easily forgettable history, but the ideal of “sustainability” is certain to be with us for a long time, and will acquire increasing commercial relevance.

In the food and beverage sector, one of the measures of sustainability is the volume of chemicals used in the process of bringing product to market in a disease- and pest-free, table-ready state.

With wine, one of the leading pests is *Botrytis cinerea*, a fungus that affects many plant species, most notably, wine grapes. The fungus gives rise to two different kinds of infections on grapes. The first, grey rot, is the result of consistently wet or humid conditions, and typically results in the loss of the affected bunches. The second, noble rot, occurs when drier conditions follow wetter, and can result in distinctive sweet dessert wines, such as Sauternes or the Aszú of Tokaj. The species name *Botrytis cinerea* is derived from the Latin for "grapes like ashes"; although poetic, the "grapes" disappointingly refers to the bunching of the fungal spores on their conidiophores, and "ashes" just refers to the greyish colour of the spores en masse.

A unique selling proposition

It's only in recent years that New Zealand has pioneered the development of a biological control agent for *Botrytis*, and it presents us with a USP (unique selling proposition) that is right in tune with the greening of many consumer and some retail chain sentiments.

But before we can begin to promote this USP, we have to start using the product. Wine companies at all levels, and especially the major players, need to re-examine their sustainable consciences, and to take a serious look at the

potential benefits of consumer perceptions of biologically-friendly wines and the higher prices such wines can maintain.

It's time for the marketers and the viticulturists to get their heads together. Or to put it bluntly; it's time for the industry to put its money where its sustainable mouth is.

How did it all begin?

Around 1996, HortResearch staff, Philip Elmer, Tony Reglinski and Robert Hill, with support from Peter Wood, were looking for a biological means of controlling botrytis in kiwifruit. The project languished until it came to the notice of Gary Wood, Montana's vineyards manager in Hawkes Bay, at that time already a leading light in Integrated Winegrape Production (IWP) the precursor of what we now know as Sustainable Winegrowing New Zealand. Gary was then a member of the committee known as Winegrowers of New Zealand, which had been established in my time at the Institute to bring together research-minded people in the Institute and the Grape Growers Council. Industry funding, plus a grant from Technology New Zealand, helped further research to a point where commercial development looked feasible. This led to the formation of Botry-Zen Ltd, headquartered in Dunedin, to take the product from the lab bench to the market.

When the company formed in June 2001, it entered into a formal agreement with an entity called WinegrapeTech (WGT), the partners in which were the Wine Institute, and the NZ Grape Growers Council, under which the company is obliged to pay WGT a royalty of 5% of any sales resulting from the commercial development of BOTRY-Zen in New Zealand or any market offshore.

The other party to the agreement, although not directly with Botry-Zen, but with WGT, is HortResearch, who share in the royalty under a separate agreement with WGT.

It soon became obvious that BOTRY-Zen was capable of effective control of botrytis in grapes, provided that a robust formulation and a suitable method of application could be devised. In the early stages, the product was available as a paste that had a relatively short shelf life and required refrigerated storage. While effective as a control agent, it could not match the ease of storage, handling and application of the existing chemicals.

Six years and \$12 million later, Botry-Zen Ltd has successfully presented BOTRY-Zen in its present form. The BOTRY-Zen dry granules are fully dispersible in water, easily remaining in spray-tank suspension long enough to ensure consistent application onto plant material. The product is totally user-friendly and to this point retains a shelf life of at least 15 months.

Production process a world first

The process used in the production of the granules has been researched, developed and commissioned in the Botry-Zen factory in Dunedin and, in the majority of aspects represents a world first. The basic active ingredient is a fungus called *Ulocladium oudemansii* which, when applied early enough blankets the flower caps and aborted berries with a coating that prevents

Botrytis cinerea spores from establishing in the bunch trash (a “no room at the inn outcome”) , and reduces the amount of *Botrytis* inoculum that is in the bunch ready to infect late in the season.

The heart of the Botry-Zen process is the propagation and multiplication of the *Ulocladium* spores, and their conversion to dry granular form.

This is achieved by growing the seed *Ulocladium* spores in the laboratory, their storage and transfer in sterile conditions to another section of the factory, where they are dispersed among a substrate of sterile grains prior to undergoing a 15-day fermentation process where the spores multiply during the ferment. Fermentation takes place in specially designed flat trays which were developed in Germany for a unique “world-first” process that in some elements are similar to the BOTRY-Zen steps. When the ferment is complete, the grains and *Ulocladium* spores are transferred (by vacuum) through complex dry-harvest and granulation equipment. The spores are separated from the grains, dried, granulated under a special formula and bagged ready for the final stage of the packaging process.

Most of the equipment used in the dry-harvest and granulation process was researched, designed and constructed in Dunedin.

Growers whose diffidence about total conversion to a biological control agent provokes a “belt and braces” approach, can use BOTRY-Zen early season and introduce chemical agents later. The manufacturers provide a list of branded chemicals that can safely be mixed with BOTRY-Zen for control of other diseases.

ARMOUR-Zen for late season

For those ready to go totally biological, the natural liquid product ARMOUR-Zen has been created and developed by the company, with ACVM registration enabling it to be used prior to 2008 vintage. The active ingredient in ARMOUR-Zen is *Chitosan*, derived from seafood. ARMOUR-Zen works by covering the developing berries and inhibits *Botrytis* spores that may be on the surface of the berry, or may later land on the berry, from germinating.

Laboratory manager Kirstin Spratt, who has been with the company since its inception, explains: “ARMOUR-Zen doesn’t have any withholding period. It can be sprayed right up to harvest. Under good agricultural practice, most growers would spray up to a maximum of five days prior to harvest to ensure the crop holds up under pressure. This means that a grower has far more assurance that the final spray can be left as late as possible in dicey weather knowing that there will be no residue problems.”

What about ‘noble rot’?

Winegrower asked Kirstin about the “good” botrytis that causes “noble rot.”

“It won’t affect noble rot so much as it’s in the berries in the later part of the season, whereas BOTRY-Zen would have controlled that earlier in the season, reducing the amount of inoculum that is around to cause noble rot later. ARMOUR-Zen would certainly reduce the amount of noble rot in a crop, but growers looking at making a botrytised wine wouldn’t be using ARMOUR-

Zen. Most likely they'd be applying botrytis to ensure an even rot," she explained.

Early problems overcome

The company's latest annual report, for year to March 31, 2007, states: "The company's working capital base was severely eroded during the year because of the delayed registration of 'ARMOUR-Zen' and because of unanticipated extended time and cost elements incurred as part of the design, manufacture and commissioning of new dry-harvest and granulation plant and equipment. This equipment is now operating to specification and represents a world-first development in its field".

Botry-Zen Ltd CEO John Scandrett said it was unfortunate that the processes required for ACVM registration for 'Armour-Zen' under the Agricultural Chemicals and Veterinary Medicines Act could not be completed until May this year, after the '06/'07 viticultural season, but registration has now been achieved. "We have the same situation in Germany, where we're waiting registration for 'ARMOUR-Zen', although we have it there for 'BOTRY-Zen'." *(At the time this article went to print Botry-Zen Limited had received confirmation of the German registration for ARMOUR-Zen).*

The shortfalls in expected revenue from the 2006/07 season meant that the company needed to raise additional capital, and through a recently-held Share Purchase Plan a wider funding base was secured in March.

"The important thing is that with the results we can now demonstrate the dry granulated current formulation is producing a field performance that is as good as the chemical products. That's the message we need to get through to the industry," said Mr Scandrett.

"Botry-Zen has had very good success for the control of both *Sclerotinia sclerotiorum* and *Botrytis cinerea* in kiwifruit, for *Botrytis* in black currants and ornamentals as well as field grown tomatoes and strawberries. The development of the product has been welcomed in Europe where crops are more disease-susceptible because they are grown at ground level for ease of mechanical harvest. In these circumstances where they are closer to the threatening fungi spores and where conditions are humid with little air movement, infection levels can be extremely high. As a result, the interest we are seeing in many parts of Europe from growers of these crops, in addition to the grape grower interest, is most substantial, he added.

Before the Company takes the BOTRY-Zen and ARMOUR-Zen products off-shore (where significantly wider royalty flows for the Winegrowers can be earned) there is a real need to demonstrate local market acceptance and it is to be hoped that grower uptake here this coming season will indeed confirm that the time has come for these products.

ARMOUR-Zen was registered in May 2007. Reg No P7570.

BOTRY-Zen WDG was registered in October 2004 (the spore suspension formulation was registered in 2002 under the Pesticides Act). Reg No P7212.