

# Science Community Focus

## Winemakers Head for the Hills – Plumpton Wine Centre Supports Learning and Industry

In the heart of the South Downs National Park, Plumpton College, renowned for its education and training in outdoor industries and countryside conservation – also hosts a sparkling gem of international research acclaim. The Plumpton College Wine Centre, which has been supporting students on BSc courses since 2007, has now established the UK's first and only dedicated wine research centre with analytical facilities capable of generating findings of international significance.

Opened by HRH Duchess of Cornwall in March 2014 the new UK Wine Research Centre, incorporating the Rathfinny Research Winery and the Jack Ward Laboratory, is an outstanding asset to support the first UK-based MSc course in Viticulture and Oenology. With its first student intake this September the course has been validated by the University of Brighton and supported by the expert contribution of Dr Aude Vernhet (Professor of Oenology in Montpellier). Dealing with all aspects of grapegrowing and winemaking the MSc course focuses on cool climate issues such as terroir, climate change and production of sparkling wine.



HRH Duchess of Cornwall speaking to Plumpton College Wine maker Peter Morgan (right) with Head of Wine Department, Chris Foss (behind) at the opening of the UK Wine Research Centre

Chris Foss, Head of the Wine Department at Plumpton commented: "Our wine courses are very popular with international students, particularly from the established vine-growing areas of Europe; a significant benefit is that the course is taught in the English language.

"We have seen student intake increase by around 30% with numbers currently about 140 full-time and 250 part time attendees. We are hopeful that the numbers on the MSc course will continue to rise considerably, eventually making it the industry standard qualification rather than the current BSc level."



MSc students processing grapes

### Supporting Industry

Operating as a facility for both the English and Welsh wine production industries who may wish to have their procedures tested and improved, the UK Wine Research Centre is now positioned to carry out trials and experimentations into:

- Viticulture - e.g. grapevine physiology, ripeness monitoring, clonal evaluation
- Winemaking – e.g. developing and testing new techniques, particularly for sparkling wine
- Wine Sensory Evaluation and Chemical Analysis, to analyse the factors affecting wine flavour.
- Wine Quality Assurance – such as closure trials

The new centre is sponsored by over 50 English wine producers, including the nearby Alfriston-based Rathfinny Estate and Chateau des Sours, near Bordeaux; it also has close links to traditional wine-producing areas such as Champagne and the Rheingau in Germany.



Research winery kindly sponsored by Rathfinny Estate

### Controlling the Environment

A new state-of-the-art system for vine propagation and wine fermentation has just been commissioned in the Rathfinny laboratory where bulk processes and wine production are carried out. Overseen by Winemaking lecturer Tony Milanowski, these five bespoke controlled environment cabinets (CECs) will be used to propagate vine cuttings and grow potted vines, while controlling key variables such as light intensity, day length, and diurnal temperature variation. In the autumn and winter, they allow for the successful manipulation of all stages of the wine production process, such as the cold storage of the grapes, the conduction of the alcoholic and malo-lactic fermentations, and the cold stabilisation of wines.

The design, construction and installation of the cabinets was undertaken by Nick Kennett of A&S Cooling, Shoreham, working with modular Matrix Coldkit systems. The five 3360L cabinets have 85mm wall and door insulation, and refrigeration and heating is provided by individual independently-controlled GEA Kuba cooling units with external heaters, coupled with remote roof-mounted L'Unité Hermétique compressors.

Air is purged with a variable-speed extraction system to maintain cabinet interiors and a Dixell XWEB500 monitor networked to XR75CX controllers maintain light and temperature. Paul Woodman of Thermofrost Cryo helped commission the controllers and ensure correct programming. Managed remotely, the CECs mimic real world environments managed day/night lighting and temperatures.

The cabinets also have two independent grow-light systems. Standard growing conditions are provided by Maxibright T5 high output fluorescent propagation lights equipped with 6500K blue-light tubes. These provide a high luminosity



CEC installation in the winery



Bacchus Vine growing under LED light



Pressing Müller-Thurgau

without disrupting the cabinet temperatures, thus allowing vines to grow close to the light source without damage. In addition, Plumpton College commissioned Tim Haworth of Cambridge HOK to provide advanced Philips GreenPower LED lighting.

These lights, used in plant physiology research, allow the study of the effects of different light wavelengths on plant growth. The Plumpton College system allows for the delivery of custom light mixes to vines up to a maximum of 133 mmol deep-red light, 87 mmol blue light and 40 mmol of far-red light.



Karen Telford

Marks & Spencer are sponsoring final year wine production student Karen Telford, who will work directly with the Marks & Spencer wine team to produce a bespoke wine from grapes grown on Plumpton College's 25 acre vineyard.

Last year's winner, Collette O'Leary, successfully developed a red wine, which was launched, to great acclaim, in M & S stores during English wine week. This year Karen will work with Sue Daniels (Winemaker at M & S) to produce a new style of pink sparkling wine, hopefully for launch in 2015.

Karen studied Chemistry at the University of Central Lancashire and worked for over twenty years in the food industry, in both technical and commercial roles.

## MSc Students make wine at Plumpton College

Mark Crumpton is one of the eager new students who joined the new MSc course led by Dr Matteo Marangon. "After working in the gardening sector for a number of years I developed a strong interest in plant science and decided to enrol on a foundation degree in Horticulture at Bicton College, which I converted to a BSc (Hons) in Bioscience. Living in France for a number of years prior to my studies piqued my interest in wine and keen to pursue my scientific understanding further, I am now studying for an MSc in Viticulture and Oenology at Plumpton College. I was impressed with the facilities the college has to offer, as well as its international reputation for quality wine research. The wine industry is such an exciting area to be involved in, particularly with the recent expansion of wine growing in the UK. The course is extremely varied, with a good balance of practical skills and research-based theory, staff are supportive and I feel I am learning a huge amount daily. After completing my MSc at Plumpton, I hope to pursue a career in vine propagation and pathology."

"One of my favourite modules is *Grape and Wine Composition & Analysis*" said Mark. "We were offered around 500 Muller Thurgau vines in the College's Ditchling Vineyard at the beginning of the course, and sampled and analysed the grapes on a weekly basis. Then, last week we harvested 100 kg of grapes from these vines, which we are transforming into wine in the new College research winery."

Throughout the MSc students learn about the science linking important compounds found in grapes and wine and applying this knowledge to the production of their own English wine. They will be encouraged and enabled to manage and monitor the whole winemaking process by using chemical and organoleptic (tasting) tests. The assays used on the grapes to inform the right moment to harvest included soluble solids by refractometry, juice pH and titratable acidity, as well as taste. Once picked, and pressed, the juice was analysed via spectrophotometry to quantify the Yeast Available Nitrogen (YAN) level, and high performance liquid chromatography (HPLC) to profile the organic acid content. The sulphur dioxide levels were determined by the Monier-Williams aspiration method. With this information, Mark and his fellow students have designed their own winemaking program. Having inoculated the juice with yeast, they will continue to closely monitor their project wines with techniques such as yeast counts with microscopes and haemocytometers, and enzymatic kits to test glucose and fructose levels.

The students will be responsible for every aspect of the production of this wine up to the bottling operation, and will learn other relevant techniques of investigation. This will promote their understanding of the winemaking process, and give them the tools and the confidence to plan and conduct their Masters project in their final semester.



Mark Crumpton



Sarah Midgley

## New wine maker at Plumpton

Sarah Midgley studied her first degree in Biochemistry at Manchester University, and then took a graduate diploma in Oenology and Viticulture at the renowned Lincoln University in Christchurch, New Zealand.

On her return to the UK in 2010, she was recruited as assistant winemaker at Camel Valley. She has since also gained extensive experience working vintages in wineries around the world, particularly in Australia, New Zealand and California.

Allied to her winemaking teaching duties at Plumpton, Sarah will also take responsibility for all the commercial side of Plumpton Wine Estate, including the wine sales activity.



BSc students conducting selective plating of wine microorganism



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