

■ Organisers' report

UV4Plants at ESP Congress

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UV4Plants organized two sessions at the European Society for Photobiology (ESP) Congress in September 2017, which was held in the charming city of Pisa. ESP congresses are intended to span the whole spectrum of photobiology and therefore include a very broad range of mini-symposia, covering aspects from medical photobiology to bacterial photosynthesis, and from molecular processes to environmental photobiology. Plant photobiology is always represented in several sessions and in Pisa there were mini-symposia on photosynthesis and cryptochrome photoreceptors. In addition, ESP agreed to have two sessions focused on plant UV photobiology, jointly organised by UV4Plants, which was a very welcome development. We hope this will become a feature of future ESP congresses because we wish to provide opportunities for UV4Plants members to meet and develop collaborations in the years between our main biennial networking meetings. ESP congresses provide an excellent opportunity to do this because they are also held every two years and interdigitate with our meetings. A welcome feature of our involvement with ESP was that they managed all aspects of registration and poster submission and our members could attend the two UV sessions, which were conveni-

ently held on consecutive days, with low registration fees. Furthermore, UV4Plants student members had reduced registration fees for the whole Congress, enabling them to attend a range of other sessions. We hope to continue our involvement with ESP at their next congress, which will be held in Barcelona in late August 2019.

One of the UV-B sessions in Pisa—UV-B Stimulated Plant Protection—was organized by Gareth Jenkins (University of Glasgow, UK) and Éva Hideg (University of Pécs, Hungary). This mini-symposium focused on the ability of UV-B exposure to stimulate protection of plants against abiotic and biotic factors. This session had four invited speakers, the two organisers together with Monika Schreiner (Leibniz Institute of Vegetable and Ornamental Crops, Germany) and Jason Wargent (Massey University, New Zealand), and there were several contributions selected from submitted abstracts. Éva Hideg started the session with a summary of how photosynthetically active radiation, UV-B and UV-A light can generate different types of reactive oxygen species in plants. Different light qualities also stimulate gene expression and biosynthesis, particularly of phenolic compounds, that ameliorate oxidative stress. Hence acclimation underpins protec-

tion. The importance of secondary metabolites, not only in plant protection but also as beneficial factors in human nutrition was highlighted by Monika Schreiner. Since UV-B is a key factor in stimulating secondary metabolite accumulation, manipulation of UV-B in the light environment will facilitate production of fruit and vegetables for a healthy diet. Gareth Jenkins summarized how both UVR8-dependent and UVR8-independent signaling pathways regulate gene expression responses that contribute to different aspects of protection against abiotic and biotic factors. Unfortunately, Jason Wargent was unable to attend in person, but sent a pre-recorded video presentation, which was very effective. The video emphasised the positive regulatory impacts of UV-B on traits that are important in crops. In particular, the acclimatory role of UV-B, detected by UVR8, on photosynthetic performance was highlighted. Further information on this point was provided by Rixta Sievers (also from Massey) in her short presentation, which showed how gene regulation by UVR8 contributed to enhanced photosynthetic activity in *Arabidopsis*. Ashutosh Sharma (University of Bristol, UK) reported how UV-B, perceived by UVR8, inhibits plant shade avoidance and thermomorphogenesis (developmental responses to elevated temperature), in particular through the regulation of PIF transcription factors, whereas Matthew Robson (University of Helsinki, Finland) showed how a combination of low temperature, UV and blue light regulates flavonoid accumulation. This response appears to involve complex functional relationships between different photoreceptors. Finally, Piotr Zglobicki (Jagiellonian University, Krakow, Poland) outlined how sugars reduce DNA damage caused by UV-B radiation by stimulating the production of UV-absorbing compounds.

The second UV-B session was organized by Annamaria Ranieri, who is a Professor at the University of Pisa, and was held in the Department of Agriculture, Food and En-

vironment. This session was entitled 'Turning photobiology into commercial reality: exploiting UV radiation for sustainable and innovative food'. As the title states, this session focused on the potential applications of UV technology in production of food from plants, which is a very important aspect of current UV-B research. Several presentations explained how UV-B exposure of crops or harvested products influenced production. Javier Martínez-Abaigar (University of La Rioja, Spain) explained how UV-B exposure of grapevines affects aspects of crop physiology, including secondary metabolite production and susceptibility to pathogens, and hence the quality of grapes and wine, and showed the importance of factors such as timing, method of application and variety. In addition, Marco Santin (University of Pisa, Italy) used metabolomics profiling to show how direct exposure of peach fruits to UV-B affects biosynthetic activity. In particular, phenolic compounds were produced through stimulation of expression of the relevant biosynthetic genes. Further speakers described effects of UV-B on other crops, including brassica vegetable crops. There were also presentations on the use of LEDs for UV-B exposure, which is an important current topic, given the need to provide specific, non-damaging UV-B treatments in a cost effective manner for growers. Timo Bongartz described the LED systems being developed by Osram for this purpose and Melanie Weisner-Reinhold (Leibniz Institute of Vegetable and Ornamental Crops, Germany) showed how UV-B LEDs affect the production of secondary metabolites in several leafy vegetable crop species. Different effects were observed for specific metabolites and qualitative and quantitative differences were observed between genotypes. Spectral quality in the growing environment can be manipulated using combinations of light sources and filter materials, but it is important to characterize the light environments so that they can be optimized for specific pur-

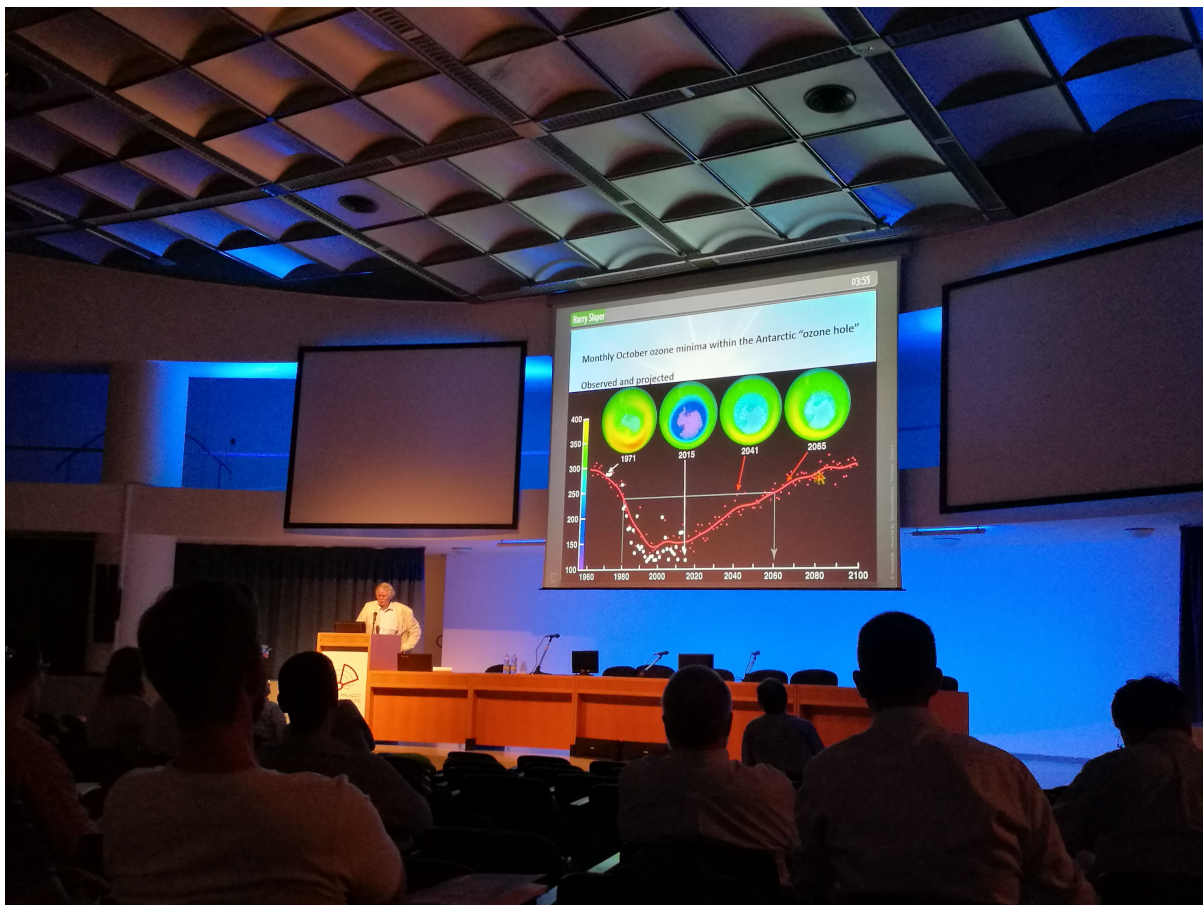


Figure 4.1: From one of the sessions at the European Society for Photobiology (ESP) Congress in September 2017. Photo: Neha Rai.

poses. Titta Kotilainen (University of Helsinki, Finland) described methods to measure and model light environments in horticultural settings and discussed how this information could be used by growers to predict the effects of particular light environments on different crops.

Both sessions were regarded as very successful and two aspects were particularly pleasing. First, the science presented was of a high standard, the topics were interesting and demonstrated the importance of UV-B research both in advancing understanding of plant responses to their environment and in helping to produce sustainable, healthy food production. Second, each session was attended by well over 60 people, and there was good discussion and interaction among

those attending, including at the posters. The strong attendance was noted by the organisers of the ESP Congress, and will provide a good basis for future UV4Plants sessions, hopefully in Barcelona in 2019. So, thanks to all who contributed to the success of the meetings.

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