

Introduction: Session 6: Simple versus Complex Controlled Environments: A Debate

In the early 1960s, the disciplines of plant physiology and physiological plant ecology were in the ascendancy. Plant biologists wished to investigate responses of plant processes to a wide range of physical conditions e.g. air temperature and humidity, light and photoperiod. Controlled environment spaces, be they cabinets, rooms or complete phytotrons, were designed to provide those conditions although, in practice, the extremes of those physical conditions, particularly temperature, were often not used. In that sense CE spaces could have been said to be over specified and expensive for the job they were asked to do.

In recent years, the rise of the methodology of molecular biology and the dominance of the discipline of molecular genetics has meant that plant biologists often only require sequential uniform batches of plants raised in identical conditions near to their optimum for growth. CEs for such work can have simpler specifications and consequently can be less expensive to buy and run.

The dilemma for scientists and for managers of CE facilities is in deciding whether they should install a mixture of simple and complex spaces or only space of one kind. The two speakers in this session take the two sides of this philosophical and practical debate, Bruce Bugbee arguing for simple environments and Terry Mansfield for complex environments.

The discussants following the presentation of the cases were Paul Austin (Palmerston North Research Centre, New Zealand) and Mark Romer (McGill University Phytotron, McGill University, Montreal, Canada).