

MODEL APPLICATION IN HORTICULTURAL PRACTICE: SUMMARY OF DISCUSSION GROUPS

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This report is a summary of group discussions at the ISHS symposium 'Models in protected cultivation' held in August 1997, Wageningen, The Netherlands. In response to the paper of Van den Bosch (1998) four questions about application of models were discussed. These four questions are mentioned below, with a summary of the comments on these questions from six discussion groups.

1. Is there a horticultural market for process control based on models?

In this question a definition of the client is missing. Is the client a researcher, an advisor or a grower? In all three cases, the model must solve a problem or show important benefits. Growers want 'solutions'; if we can solve their problem without a model: fine, if we need a model: that's fine too. Models will be used in practice more and more. The company size and the importance of automation and information technology are rapidly increasing, which increases the need for models. This may well be simple adaptive models, as well as detailed explanatory ones. Inside some process control computers models are already incorporated, sometimes without the users being aware of it. Although there seems to be no large market for models for set-point generation, there is a need for redesign of climate control programs at the level of set-point realisation. The present control programs are often ill-structured, which could be overcome by a design based on models. Finally, it was argued that even if there was no market for process control based on models, this should not stop us from developing models. Models are powerful tools, not only in greenhouse climate control, but perhaps even more in yield prediction, planning, decision support and in research and education. Models allow for testing hypotheses, synthesising knowledge, describing and understanding complex systems and comparison of different scenarios.

2. Is a step by step approach a prerequisite for successful introduction of models?

In general, a successful introduction of models in practice is only possible by a step by step approach. Confidence in models should be gained by working with end-users and demonstrating benefits. Information should be represented in a simple, straight-forward way. However, a step by step approach is not always possible, e.g. when a complete new concept is introduced. An example is the shift from traditional climate control where the grower supplies set-points to the computer, to climate control based on controlling processes and set-point generation by a model. In such situations, the step by step approach may be reflected in using the new concept first as a learning tool: the model shows the grower what the alternative control system would do in the present situation and the grower can decide to take over this strategy or to follow his old strategy. Hence, the new control concept runs in 'background mode' only, giving advice. When confidence is gained, the new control concept may replace the old one.

3. Do growers need general, robust models rather than detailed models for specific situations?

Growers have different needs, but still we should be able to extract general features which will allow for a group-wise development of models. It is more the automation

companies in horticulture than the growers who need general models, as specific models will have only a small market. In fact, growers need models exactly tuned to their specific requirements. To overcome this apparent conflict, general, robust models must be developed. The structure of these models should be such that they can be used for different specific situations by changing parameters, not changing the model structure.

4. Is the gap between development and practical application of models still increasing?

In many cases there is a big gap between development (science) and practical application of models. The publication of a scientific model does not automatically lead to application of the model in practice. Often scientific models as such do not solve the decision problem of the grower. Team work between growers, automation companies and researchers, from the beginning of a project, is needed to overcome the gap between development and practical application of models. Education of end-users and a good user interface could also help bridging the gap.

References

Van den Bosch, J.A.M., 1998. Opportunities and bottlenecks for model application in practice. *Acta Hortic.* (this volume)