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HIGHLIGHTS

- Different aspen clones have characteristic responses to elevated atmospheric concentrations of carbon dioxide and ozone
- Observed aspen community phenotypes for an aspen forest ecosystem can be accurately modeled using an Artificial Neural Network approach
- Clone-specific regulatory networks associated with sensitivity to elevated atmospheric concentrations of carbon dioxide and ozone are predicted
- The specific molecular mechanisms that distinguish clone-specific responses to environmental conditions are proposed by this computational model will form the basis for future experimental validation

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