HONORARY MEMBER

The ESA's Honorary Member Award is given to a distinguished ecologist who has made exceptional contributions to ecology and whose principal residence and site of ecological research are outside of North America. There are a maximum of 20 Honorary Members at any one time. This year Dr. Christian Körner of the Institute of Botany, University of Basel has been recognized as a new honorary member of ESA.

Christian has had an enormous influence on the fields of plant physiological ecology and ecosystems ecology. He has had so many contributions in so many different areas that we can only highlight a few. Each of these accomplishments would have made for an outstanding research career on its own. To have so many, and in such varied areas, is truly outstanding.

Christian founded and has led the world's only study of the CO_2 response of mature trees, using a very innovative approach: a network of irrigation tubing with laser-cut holes painstakingly placed among all of the branches of all of the trees with a construction crane to distribute pure CO_2. This study showed that the overall growth response of 32–35 m tall trees in a moist, deciduous forest to elevated CO_2 was nil, even though leaf-level photosynthesis remained high. The study has been enormously influential in getting the CO_2 response community to rethink how much growth and carbon storage stimulation rising atmospheric CO_2 might force. Studies at the site have also shown that different tree species respond differently, and most of the extra photosynthesis promoted by elevated CO_2 rapidly returns to the atmosphere. Numerous exciting and influential papers have come from work at the site. Christian has also established elevated CO_2 studies for communities established after glacial retreat and for trees at an alpine treeline. These studies showed that the glacial retreat communities and pine at timberline did not respond to elevated CO_2, but larch did respond. These are clever, important studies that add to a richer understanding of plant responses to CO_2, and also suggest the ecological community's limited ability to predict plant response to elevated CO_2.

Christian's work challenging one of the central tenets of forest biology—that trees are carbon limited—is likely his most influential. Currently, all models of ecosystem function that estimate photosynthesis and carbon partitioning to different plant parts assume that trees are carbon limited. That is, that all trees will show a growth response when given higher CO_2, and that photosynthesis can be modeled by knowing leaf area, photosynthetic capacity, light attenuation, and environment. These models "push" carbon into the tree, where it is partitioned into various sinks. Christian has been posing the question, "What if the environmental response of sinks, not photosynthesis, actually controls growth" (a "pull" model)? Through work on trees at alpine treeline, the CO_2 experiments mentioned above, and work in other places (for example, tropical trees under drought), Christian has been assembling evidence that in many cases, trees are not carbon limited. Rather, they seem to be sink limited, which opens up entire new problems and opportunities for modeling plant growth responses to the environment and CO_2. The modelers have yet to embrace this approach, because the experimentalists have yet to provide the appropriate response surfaces, but we suspect future models will follow this approach. His ideas have implications beyond modeling: they are forcing us to rethink the basic question of what controls growth in trees and the correct interpretation of core concepts that depend on carbon being limiting, like water and nutrient use efficiency and growth–defense theories. Environmental regulation of sinks will also likely be important for getting the response to CO_2, temperature, drought, and nutrition correct, and these are all issues important for making predictions about the terrestrial biosphere for global change.

Christian has accomplishments in many other areas beyond those listed above. He has also been a strong scientific leader for European science, and educated many Ph.D. and postdoctoral fellows through his science.