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Sommario/riassunto	<p>Understanding plant responses to abiotic stresses is central to our ability to predict the impact of global change and environmental pollution on the production of food, feed and forestry. Besides increasing carbon dioxide concentration and rising global temperature, increasingly frequent and severe climatic events (e.g. extended droughts, heat waves, flooding) are expected in the coming decades. Additionally, pollution (e.g. heavy metals, gaseous pollutants such as ozone or sulfur dioxide) is an important factor in many regions, decreasing plant productivity and product quality. This Research topic focuses on stress responses at the level of whole plants, addressing biomass-related processes (development of the root system, root respiration/fermentation, leaf expansion, stomatal regulation, photosynthetic capacity, leaf senescence, yield) and interactions between organs (transport via xylem and phloem, long-distance signaling and secondary metabolites). Comparisons between species and between varieties of the same species are helpful to evaluate the potential for species selection and genetic improvement. This research topic is focused on the following abiotic stresses and interactions between them: - Increased carbon dioxide concentration in ambient air is an important parameter influenced by global change and affects photosynthesis, stomatal regulation, plant growth and finally yield. - Elevated temperature: both the steady rise in average temperature and extreme events of shorter duration (heat waves) must be considered in</p>

the context of alterations in carbon balance through increased photorespiration, decreased Rubisco activation and carboxylation efficiency, damage to photosynthetic apparatus, as well as loss of water via transpiration and stomatal sensitivity. - Low temperatures (late frosts, prolonged cold phases, freezing temperature) can decrease overwintering survival rates, productivity of crop plants and species composition in meadows. - Water availability: More frequent, severe and extended drought periods have been predicted by climate change models. The timing and duration of a drought period is crucial to determining plant responses, particularly if the drought event coincides with an increase in temperature. Drought causes stomatal closure, decreasing the cooling potential of transpiration and potentially leading to thermal stress as leaf temperature rises. Waterlogging may become also more relevant during the next decades and is especially important for seedlings and young plants. It is not the presence of water itself that causes the stress, but the exclusion of oxygen from the soil which causes a decrease in respiration and an increase in fermentation rates followed by a period of potential oxidative stress as water recedes. - Salinity: high salt concentration in soil influences soil water potential, the water status of the plant and hence affects productivity. Salt tolerance will become an important trait driven by increased competition for land and the need to exploit marginal lands.
