Fundamental Biology of Plants and Plant Pests

Goal: Colorado State University will enhance its focus and depth in graduate education and research in fundamental plant biology and be recognized nationally and internationally as a competitive institution for national and international grants that is attractive to graduate students across the United States and the world. This will include graduate education and research in molecular biology and genomics of crop plants and their pests, mechanisms of biological resistance to pests, mechanisms of invasion of weed species, plant physiology and ecology, and understand the molecular, cellular, whole plant, and ecological foundations for crop improvement and crop pest management.

Purpose: Fundamental plant biology linking basic science with applied science is important to bring the results of basic plant science toward a usable form for applied agricultural sciences. Molecular biology and genomics are opening many new pathways for crop plant improvement and pest management, which will enhance the economic development of agricultural regions, enhance human health through more nutritious and safer food products, and find fundamental solutions to societal issues through renewable and sustainable crop production and pest management. Successful applied crop science, environmental science, and pest management do not occur in the absence of scientists actively involved in fundamental plant and pest sciences. Colorado State University is in a strong position to assist with the economic development of Colorado's agricultural industry and to enhance the public health and well-being of citizens with research in fundamental genetic potentials of crop plants, management of plant pests, and preparation of industry, government, and academic scientists.

Strategic Actions:

- Build greenhouse and laboratory facilities (including growth chambers) to EPA, USDA-APHIS, and NIH standards to permit research with transgenic and exotic pest organisms.
- Build faculty capacity in secondary metabolism and the genomics and population genetics of complex traits.
- Fully engage in the cross-college plant molecular biology consortium to seek major grants, training grants, and graduate student recruiting. Develop CSU strategic responses and connections to new directions and needs of national organizations.
- Expand a separate cross-college graduate degree program.
- Expand involvement in a Clean Energy supercluster, Crops for Health, C2B2 and Infectious Diseases to build Plant Science program strategically.

Critical Resource Growth Needs:

- Secure funds to build/improve greenhouse and growth chamber facilities for future phases. Develop vision for long-term growth.
- Secure one endowed chair faculty position.
- Enhance contract and grant income.
- Add $100,000 annually for first year graduate students support in the molecular plant science consortium.
- Renovate or build new office and research laboratory space for two new faculty positions.
- Add faculty positions in secondary metabolism, genomics of complex traits and population genetics of complex traits.

Personnel:
Administrative Advisor and Steering Committee Chair: Tom Holtzer
Steering Committee Leadership: Jan Leach and Dan Bush
Steering Committee Members: Nora Lapitan, Cecil Stushnoff, Sarah Ward, Craig Bond