

Science and Management of Pest Insects, Plant Pathogens and Weeds

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research, and outreach in entomology, plant pathology, and weed science; be recognized as a primary source of pest management expertise in Colorado and the Mountain West region; and be recognized internationally for research and graduate education in genetic determinants of host plant resistance, fundamental mechanisms of biological invasions, and ecology, bioinformatics, genomics, and population genetics of pests. Undergraduate education will include contributions of courses to undergraduate agricultural degrees and introductions to plants, insects, and agriculture to the university's core curriculum. Graduate education and research will provide fundamental and applied science regarding pest species (their taxonomy, genomics, population genetics, and ecology) and pest management that is environmentally sound and economically effective. Outreach will include applied research and education relevant to emerging issues of Colorado's agricultural industries, including biosecurity, safe and effective pesticide use, and implementation of effective pest management strategies that do not rely on pesticides, as well as providing the primary source of pesticide applicator training in Colorado.

Purpose: Management of weeds, insect pests and plant pathogens is one of the most costly inputs that clientele in agriculture, the green industry, and consuming households must finance every year in Colorado. A diverse and expanding pest complex requires enhanced management skills that often increase production costs. A conservative loss estimate of 5 to 10% due to plant pests could cost Colorado producers in urban and rural settings \$50 to \$100 million annually. There is a long-term need for a comprehensive, high quality, integrated pest management system encompassing the disciplines of entomology, plant pathology and weed science. Pest activity and severity are dynamic and thus demand for management education and a systems approach will be ongoing. Integrated Pest Management (IPM) is the application of disciplinary, scientifically-based knowledge to profitably solving practical problems related to management of pests in agricultural and non-crop systems and landscapes in environmentally sound ways. Special emphasis within the Pest Management Team is placed on generating and providing information related to science-based policy, pest activity, pest diagnostics and identification, pest management recommendations, pest forecasting, safe and effective pesticide use, restoration ecology, integrated vegetation management, and the appropriate relationship of pest activity to pesticide use, pesticide alternatives, and pests versus profitability. New targets for IPM programs arise constantly as exotic, invasive species are creating unanticipated challenges in both agricultural and non-agricultural environments; combined with potential biosecurity breaches and mitigation. At the undergraduate level, the Department of Bioagricultural Sciences and Pest Management offers two minors (Entomology and Plant Health). However, a much more important aspect of the department's undergraduate program is targeted at providing educational opportunities to students in majors in the College of Agricultural Sciences and across the campus in entomology, plant pathology, weed science, and pest management. In addition, the department's faculty are very active participants in the Life Sciences program (teaching sections of LIFE 102 Attributes of Living Systems and BIO 320 Ecology), and in several courses taught under the "AGRI" designation. (e.g. AGRI/IE 102 Plants and Civilizations and AGRI/PHIL 330 Agricultural Ethics).

Strategic Actions:

- Implement follow-up action items from 2007 Extension meeting addressing issues in Pest Management.
- Enhance applied research and teaching facilities and graduate student recruiting.
- Add faculty strength in Integrated Pest Management of invasive species, vegetable crops, specialty crops, organic and sustainable agriculture.
- Take the Bioagricultural invasions (insects, plant pathogens, and weeds) research and graduate degree program worldwide.
- Secure placement of the Gillette Museum in renovated/new building space.
- Develop MS degree (non-thesis) in Integrated Pest Management (modern diagnostic techniques).

Critical Resource Growth Needs:

- Renovate space for the Gillette Museum of Arthropod Diversity (\$1.8 million) and find short-term solution to space needs. Participation in new museum design process.
- Secure at least one endowed faculty chair(s) in the area and first year graduate stipends.
- Renovate or build new office and research laboratory space for two new faculty positions.

Personnel:

Administrative Advisor and Steering Committee Chair: Tom Holtzer
Steering Committee Co-Chairs: [Howard Schwartz](#) and [Andrew Norton](#)

Steering Committee Members: Tony Koski, Frank Peairs, Ned Tisserat, Sarah Ward, Thad Gourd, Cynthia Brown, Scott Haley, James Pritchett, Scott Nissen