

# Plant Research

## Description

[su\_spoiler style="fancy" icon="chevron" title=" Regulated or Restricted Agents "] Research with certain plants and plant pests may be subject to state and federal regulations:

- Plant research involving noxious weeds, invasive plants, and certain plant pests, plant-associated microbes, and plant diseases are regulated by the [Florida Department of Agriculture and Consumer Services Division of Plant Industry](#).
- The movement, use, possession, or release of exotic or potentially harmful plant-associated arthropods, biological control agents, plant pests, plant pathogens, noxious weeds, and invasive plants may be regulated by the [USDA Animal and Plant Health Inspection Service](#).
- Research involving transgenic plants and plant-associated organisms may fall under the regulatory purview of multiple agencies:
  - The NIH regulates research with genetically engineered plants, genetically engineered plant-associated microbes, and genetically engineered plant associated macroorganisms (arthropods and nematodes). For more information, please refer to the [NIH Guidelines](#).
  - The [USDA Biotechnology Regulatory Service](#) regulates certain organisms developed using genetic engineering that may pose a risk to plant health.
  - The [FDA](#) regulates human and animal foods derived from plants including those that have been developed using genetic engineering or genome editing techniques, commonly referred to as “GMOs” (Genetically Modified Organisms) or as “bioengineered”.
  - The [EPA](#) regulates biotechnology for use in pest management including plant-incorporated protectants, genetically modified microbial pesticides, and herbicide-tolerant crops.
- A subset of plant pathogens are subject to export controls. For more information, please refer to the [Bioagent Export Control List](#).
- Plant pathogens which have the potential to pose a severe threat are regulated by the Federal Select Agent Program. Please see the [list of USDA Plant Protection and Quarantine \(PPQ\) Select Agents and Toxins](#).

[/su\_spoiler] [su\_spoiler style="fancy" icon="chevron" title=" Biosafety Principles "] Since plant research typically does not pose a human health hazard, biosafety principles are primarily designed to protect the natural and agricultural environment. Care must be taken to

- avoid the unintentional transfer of plant genes, recombinant or otherwise, to other plants
- prevent unanticipated, harmful effects to organisms or the environment outside the experimental site/facility
- control the inadvertent spread of pathogens or noxious weeds to crops or native vegetation
- avoid the introduction of unwanted exotic organisms into a new habitat

[/su\_spoiler] [su\_spoiler style="fancy" icon="chevron" title=" Biosafety Levels"] It is important to note that regulatory agencies do not designate a particular biosafety level for research when issuing permits. They instead publish guidelines for containment construction standards, with suggested methods for achieving the standard, along with specifying containment measures for regulated articles on a case-by-case basis. As such, confusion often arises regarding what constitutes an appropriate biosafety level for plant research.

Four biosafety level designations have been established in the NIH Guidelines for plant research as detailed in [Appendix L](#): BL1-P, BL2-P, BL3-P, and BL4-P (*no BL4-P experiments are permitted at the University of Florida*). The standards detailed in the NIH Guidelines may be further supplemented by “[A Practical Guide to Containment, Greenhouse Research with Transgenic Plants and Microbes](#)”.

Discerning the appropriate biosafety level is dependent upon a risk assessment.

[/su\_spoiler] [su\_spoiler style="fancy" icon="chevron" title=" Risk Assessment "] Key factors in the risk assessment include:

- specific organism(s) under study
- geographic, ecological, and agricultural environment surrounding the study site
- physical/mechanical barriers available, and
- scientifically accepted culture techniques

[/su\_spoiler] [su\_spoiler style="fancy" icon="chevron" title=" Biological Containment Strategies "]

Containment may be achieved through physical or biological means:

- Physical containment may include the use of plant growth chambers, greenhouses, catch trays under plants to prevent the spread of contaminated soil, etc.
- Biological containment strategies may include the removal or inactivation of plant reproductive structures (pollen and seed), timing of experiments so that plant-associated microorganism(s) under study are not viable in the outside environment, or the exclusion of vectors or fomites that spread plant pathogens.

[/su\_spoiler] [su\_spoiler style="fancy" icon="chevron" title=" Roles and Responsibilities "] It is the sole responsibility of the Principal Investigator to apply for any necessary permits. In addition to obtaining relevant permit approvals, the use of regulated materials will require a Biohazard Project registration within the EH&S [Gator TRACS](#) online safety platform. Registrations are reviewed and approved by the Biosafety Office and/or Institutional Biosafety Committee. Within this registration system, investigators will need to upload current versions of permits, field release approvals, and other supporting documentation.

Through routine research safety surveys, EH&S will help ensure permit and project stipulations are being met. If you have any questions regarding plant research, please do not hesitate to contact the EH&S Biological Safety Office ( [bs@ehs.ufl.edu](mailto:bs@ehs.ufl.edu) ).

[/su\_spoiler]