

EXECUTIVE SUMMARY [NON-CONFIDENTIAL, NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]: State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project relevant to California. Do not include proprietary or confidential information. This may be distributed before the funding decision has been finalized.

Phosphorus (P) is second only to nitrogen as the most limiting nutrient for plant growth and development on much of the world's arable land. The use of P fertilizer to overcome this problem has devastating ecological consequences. Run-off P is considered the main cause for eutrophication of lakes and estuaries. In addition, world resources of inexpensive rock phosphate are estimated to be depleted in as little as 60 years. Moreover, inexpensive P-fertilizers are not available in the tropics and subtropics where most of Earth's population lives. The well-characterized legume white lupin (*Lupinus albus* L.) is an illuminating model system for understanding plant adaptations to low P habitats. However, its use as a model plant has been restricted by the limited set of biotechnological tools available for this plant species. The proposed experiments are designed to establish new genetic and molecular tools to characterize nutrient-stress responsive genes of unknown function in proteoid roots of white lupin. The long-term goal of this research is to increase the ability of other crop plants to adapt to low P, and thus to drastically reduce the need for P-fertilizer.