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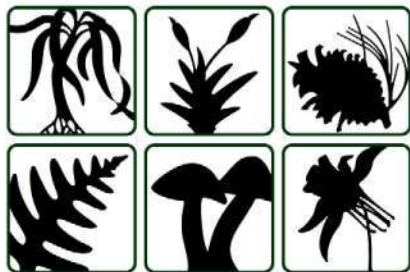
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Cover Illustration: *Lupinus lepidus* Lindl. (Fabaceae) was one of the first higher plant species to colonize primary surfaces after the May 1980 eruption of Mount St. Helens, Washington, United States. On the infertile, acidic pyroclastic flows, *L. lepidus* formed localized, monospecific patches with high population growth rates and densities. The patches had a high lupine cover and a suite of invaders. The nitrogen-fixing capacity of this legume has received ample attention, and it is also acknowledged that, as a result of its presence, chemical weathering in soils of the "islands of soil fertility" in the vicinity of the individual lupine plants. However, the possibility that *L. lepidus* might also enhance the availability of phosphorus (P) in the acidic pyroclastic substrate through the release of carboxylates from its cluster-like roots has largely been ignored. *Lupinus* species are nonmycorrhizal or weakly mycorrhizal at most, but several produce cluster roots or cluster-like roots, including *L. lepidus*. These specialized roots release vast amounts of phosphate-mobilizing carboxylates (inorganic anions), yet some plants release large amounts of carboxylates without specialized roots. These traits associated with nutrient acquisition make lupines well-suited for either P-impoorished soils or soils with large amounts of P that are poorly available for most plants, e.g., acidic or alkaline soils. In contrast to the focus on the nitrogen-fixing capacity of lupines and their enhancement of chemical weathering of soils, their possible role in enhancing the availability of P in the substrate through the release of carboxylates from their (cluster) roots has received very little attention. Lupines are an ancient crop in South America and the Mediterranean with great potential to be developed further for high-protein feed and food, cover crops, and phytoremediation. In "How a phosphorus-acquisition strategy based on carboxylate exudation powers the success and agronomic potential of lupines (*Lupinus*, Fabaceae)" on pp. 263–288 in this issue, Lambers et al. explore how common the nonmycorrhizal P-acquisition strategy based on exudation of carboxylates is in the genus *Lupinus*, concluding it is likely far more widespread than generally acknowledged. This trait may partly account for the role of lupines as pioneers or invasive species and also makes them suitable crop plants while we reach "peak phosphorus". (Photo: John Bishop).



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Abbreviations

Miscellaneous: AFLP, amplified fragment length polymorphisms; a.s.l., above sea level; bp, base pair; BP, before present; BSA, bovine serum albumin; cpDNA, chloroplast DNA; CTAB, hexadecyltrimethylammonium bromide; cv., cultivar; ddH₂O, double-distilled water; dNTP, deoxyribonucleotide E.C., Enzyme Commission; EDTA, ethylene diamine tetra-acetic acid; f. sp., forma specialis; indels, insertions and deletions; ITS, internal transcribed spacer; LM, light microscopy; mya, million years ago; PAGE, polyacrylamide gel electrophoresis; PCR, polymerase chain reaction; RAPD, random amplified polymorphic dimorphism; SDS, sodium dodecyl sulfate; SEM, scanning electron microscopy; s.l., sensu lato; s.s., sensu stricto; subsp., subspecies; TEM, transmission electron microscopy

Genetics: *A*, mean number of alleles per locus; *D*, mean genetic distance; CI, consistency index; *F*, fixation index; *F_T*, total deviation from Hardy-Weinberg expectations; *F_{ST}*, genetic diversity among populations; *F_{IS}*, inbreeding within populations; *G_{ST}*, the proportion of genetic diversity among populations; *H_e*, Hardy-Weinberg expected heterozygosity; *H_o*, observed heterozygosity; MP, most parsimonious tree; *n*, individual chromosome number; *N_m*, mean number of migrants per generation; *P_p*, percentage of polymorphic loci; RI, retention index; *x*, base chromosome number

Statistics and math: ANOVA, analysis of variance; CV, coefficient of variation; df, degrees of freedom; *N*, number of individuals; *p*, probability; *P*, level of significance; PCA, principal components analysis; *r*, coefficient of correlation; SE, standard error; SD, standard deviation