Long-term Arsenic hyperaccumulation by *Pteris vittata* from contaminated soils and the effect of phosphate rock and increased plant density.

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Raised beds are being used to evaluate the effect of phosphate rock (PR) and increased planting density on *P. vittata* biomass and hyperaccumulation over repeated harvests. Three soils collected from As-contaminated sites (21-114 mg As kg^{-1}) were mixed with 15 g^{-1} kg^{-1} PR and placed into raised beds to a depth of 30 cm (each bed contains four 0.36 m^2 quadrants). Three month old *P. vittata* plants were spaced ~15 cm apart (9 per quadrant). Slow release fertilizer was applied initially in the form of granulated 10-0-10 for soil containing PR and 19-6-12 for plants in the control pots. The first harvest followed 6 months of growth; fronds were cut to ~15 cm to limit stress to the plants. Fronds from plants grown with PR contained ~75% more biomass (wet weight) than the controls but contained less As (~30%). However, more total As was removed (~35% more) due to the increase in biomass. Soil cores from each quadrant were separated by the top (0-15 cm) and bottom (15-30 cm) of the beds and fractionated. The soil amended with PR lost 2% more As than the control in the top 0-15 cm and 8% more from the 15-30 cm section. The soluble As was depleted more than any other fractions, with no differences between treatments. *Pteris vittata* is capable of remediating arsenic-contaminated soils on long-term basis via tailored application of PR, which will supply low-Pi, stimulate root growth and allow for increased planting density.