

A lawn is better than fertilizer for growing healthy blueberries

March 12 2019



Intercropping with grasses is an effective and sustainable alternative to chemical treatments for maximizing blueberry yield and antioxidant content in limey soils. Credit: Dr. José I. Covarrubias

Blueberries are prone to iron deficiency—and correcting it increases their health-enhancing antioxidant content, researchers have discovered.

Published in *Frontiers in Plant Science*, their study shows that growing grasses alongside [blueberry](#) plants corrects signs of iron deficiency, with associated improvements in berry quantity and quality. The effects are comparable to those seen following standard chemical treatment—providing a simpler, safer, cheaper and more sustainable strategy for blueberry farming on sub-optimal soils.

What do superfruits eat?

All soils are rich in iron, but nearly all of it is insoluble.

"Most plants get enough iron by secreting chemicals that make it more soluble," explains senior study author Dr. José Covarrubias, Assistant Professor of Agriculture Sciences at the University of Chile. "These iron 'chelators' can be released directly from the roots, or from microbes that grow among them, and allow the iron to be absorbed."

"Blueberries, however, lack these adaptations because they evolved in uncommonly wet, acid conditions which dissolve the iron for them."

As a result, most of the world's relatively dry or alkaline ('limey') cropland is unsuitable for optimal blueberry growth.

"Iron is essential for the formation and function of plant molecules like chlorophyll that allow them to use energy," Covarrubias continues.

"That's why iron deficiency shows up as yellowing leaves—and drastically reduces plant growth and yield.

"And in blueberries, iron-dependent enzymes also produce the 'superfruit' antioxidants responsible for their celebrated blue skin and health-enhancing effects."

Strong blueberries must pump iron—but at what cost?

There are two approaches to correcting iron deficiency in blueberries: acidify the [soil](#), or add synthetic iron chelators. Each has its drawbacks, says Covarrubias.

"The commonest industrial approach is soil acidification using sulfur, which is gradually converted by soil bacteria into sulfuric acid. The effects are slow and difficult to adjust—and in waterlogged soils, hydrogen sulfide might accumulate and inhibit root growth.

"Acids can also be added directly via irrigation systems for more rapid acidification—but these are hazardous to farmers, kill beneficial soil microbes, and generate carbon dioxide emissions.

"A commoner strategy among growers is application of iron bound to synthetic chelators—often sold as 'ericaceous fertilizer' - but these are very expensive and leach potentially toxic chemicals into the water table."

A cheaper, safer alternative is needed for efficient large-scale blueberry production. Thankfully, one already exists.

"Grasses—which are well-adapted to poor soils—can provide a sustainable, natural source of iron chelators via their roots when grown alongside fruiting plants. Intercropping with [grass species](#) has been shown to improve plant growth and fruit yield in olives, grapes, citrus varieties—and most recently, in blueberries."

A grassroots approach to sustainable blueberry farming

Now, Covarrubias and colleagues have brought intercropping a step closer to the mainstream of blueberry cultivation.

For the first time, they measured the effects of different methods of iron chelation on antioxidant content and other fruit qualities in blueberries.

"In an orchard of 'Emerald' blueberry bushes cultivated in alkaline (pH 8) soil, we compared the effects of five different iron chelation treatments: a 'gold-standard' synthetic iron chelator (Fe-EDDHA), intercropping with grass (common meadow grass or red fescue), cow's blood (Fe-heme), or no treatment (control)."

"We found the association with grasses increased not only the total weight and number of blueberries per plant, but also the concentration of anthocyanins and other antioxidant compounds in their skins, compared to control. The effect sizes were comparable with the proven synthetic chelator Fe-EDDHA, whereas applications of Fe-heme from cow's blood—a fertilizer commonly used in home gardens—had no significant effect."

The beneficial effects paralleled improvement in the plants' iron status (leaf color), which was also comparable between the grass-associated and the Fe-EDDHA-treated plants. None of the treatments had a significant effect on average berry weight

Turf is ready to roll out for healthier blueberries

A potential limitation of intercropping observed in the study was a decrease in berry firmness, since firmer berries are favored by consumers.

"The association with grasses decreased berry firmness compared with

control plants, whereas the berries collected from plants treated with Fe-EDDHA reached intermediate values.

"However chemical analysis showed a non-significant trend towards increased ripeness in the berries collected from the intercropped plants, which could account for this small difference."

Intercropped [plants](#) also required an additional water supply to maintain a similar soil moisture to other treatments, but plant management was otherwise straightforward and the same across groups. The grasses were kept cropped between 5 and 15cm—a typical range for an attractive mown lawn.

"Our findings validate intercropping with grasses as a simple, effective, sustainable alternative to standard [iron](#) correction strategies in blueberries," concludes Covarrubias. "Both commercial and private growers can put this strategy to use right away to boost their blueberry crop and antioxidant content."

More information: *Frontiers in Plant Science*, [DOI: 10.3389/fpls.2019.00255](#) , [www.frontiersin.org/articles/1...fpls.2019.00255/full](#)

Provided by Frontiers

Citation: A lawn is better than fertilizer for growing healthy blueberries (2019, March 12) retrieved 6 May 2024 from <https://phys.org/news/2019-03-lawn-fertilizer-healthy-blueberries.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.