

Nutrient blend dashboard approach to optimize fruit set and growth of *Biloxi* blueberries

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INTRODUCTION & AIM

In agronomy and agriculture, the significance of *Vaccinium* species is noteworthy, as they contribute substantially to economic, nutritional, and ecological dimensions.

High-value crops such as blueberries (*Vaccinium corymbosum*), cranberries (*Vaccinium macrocarpon*), and bilberries.

Blueberries are known as “longevity fruits” due to their high antioxidant capacity against free radicals and reactive species.

Offering: **flavonols and resveratrol**, supporting cognitive function, improving insulin sensitivity, and protecting against chronic conditions.

Aim of Study

The present study was conducted to optimize the growth size of the *Biloxi blueberry* variety by establishing a heuristic dashboard of soil nutrients and monitoring fruit set percentage according to maximizing the nutrient blend by fertilized water irrigation (10 sets per day in 90 days harvest period).

METHOD

The berries are bluish-black, globose, with purple pigmented flesh and brownish-red seeds, sometimes covered by a gray bloom. Flowering occurs in early spring as leaves emerge, making the plant susceptible to weather fluctuations. Cold spells during this time can reduce pollinator activity, particularly bees and flies, while frost can damage blooms and affect berry development.

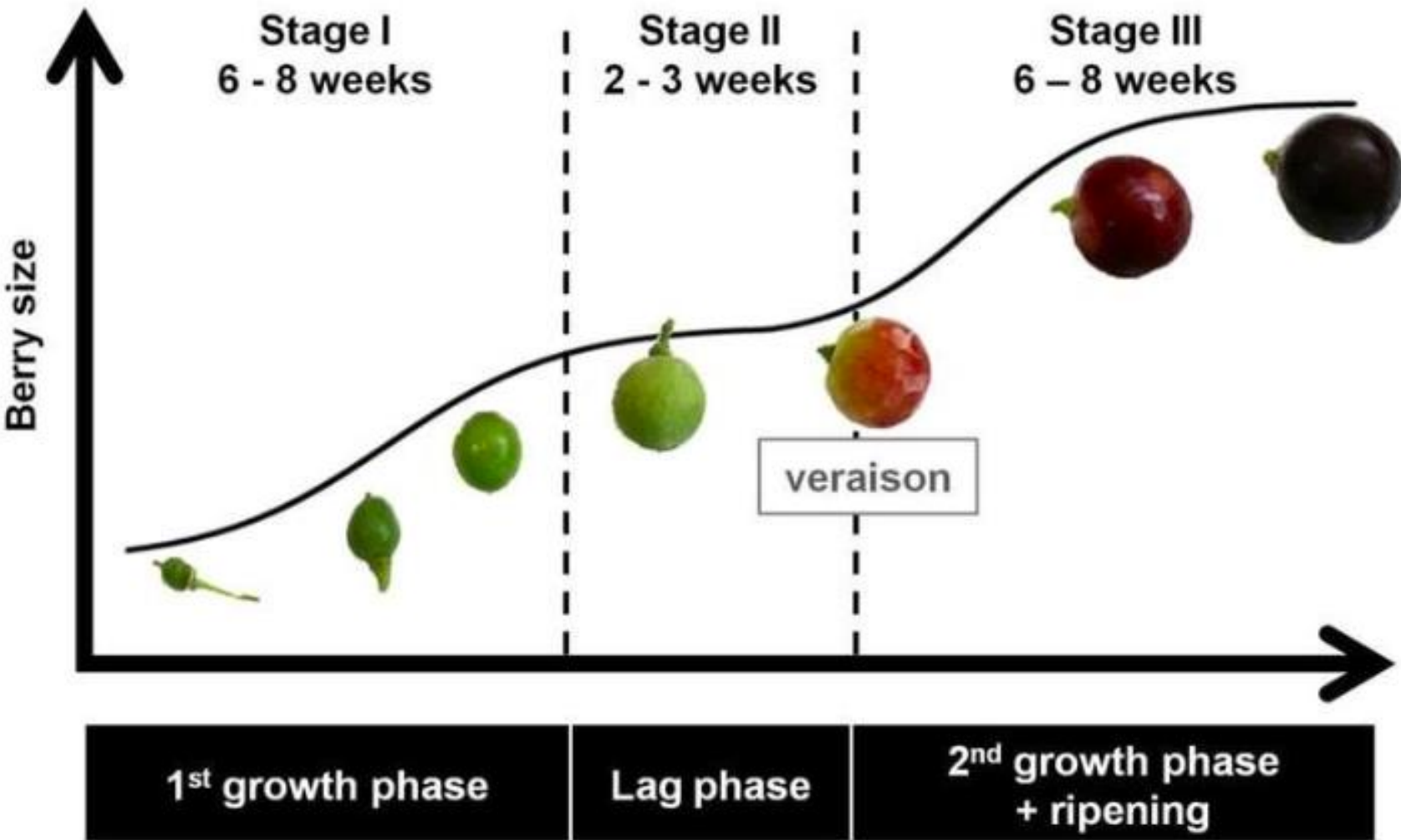


Figure 1. Growing states of blueberries

The plant produces spheroidal blue or black fruits, which are intensely colored and measure between 5 and 9 mm in diameter. The pulp shares the same dark hue as the peel, offering a sweet flavor with astringent notes. After harvesting, the fruit was analysed for size, weight and physicochemical properties (total solids, titratable acidity, total sugars and reducing sugars) using standard procedures.

RESULTS & DISCUSSION

Chemical fertilizers, primarily nitrogen (N) and potassium (K), are widely used to boost crop yields, including blueberries. These macronutrients are vital for photosynthesis and the transport of its products. Imbalances in their levels can disrupt assimilation processes, affecting sugar metabolism and carbon assimilation.

Table 1. The heuristic dashboard of blueberries growing conditions

Parameter	Property	Limits
Physico-chemical analysis	Total solids	11-12 ^Brix
	Titrate acidity	~ 0.45%
	Total sugars	~8.5%
	Reducing sugars	~6%
	p.H level	min: 5.5 max: 6.0
Harvest characteristics	Water distribution	2 min set/ 10 sets per day
	Fruit set	>60%
	Fruit size in maturity	10mm>diameter ≤16 mm
	Fruit weight	>1.4 gr
	Minerals blend	
Acidity part	potassium nitrate	min 25% max 25%, optimal 22
		min 10% max 20%, optimal 20
	magnesium sulphate	min 7% max 8.5%, optimal 8.3
		monoammonium phosphate
	non-acidity part	Iron chelate
phosphoric acid		p.H dependence
calcium nitrate		min 27%, optimal 30
ammonium sulphate		min 8%- max 20%, optimal 8.7
boric acid		max 0.5%, optimal 0.4

The heuristic dashboard combined acidic and non-acidic nutrient blends to maximize growth during the 90-day flowering and fruiting period. Irrigation with the optimized nutrient mixture increased berry size to 13.0 ± 0.1 mm, representing an average growth enhancement of 2 mm compared to control samples.

The study demonstrate that a nutrient-blend dashboard is an effective tool for improving fruit set, growth performance, and quality traits in *Biloxi* blueberries, reinforcing their value as a rich source of antioxidants and “longevity fruits.”

CONCLUSION

Key strategies include soil management techniques like cover cropping and mulching, which improve soil health and prevent erosion. Integrated Pest Management (IPM) combines biological controls and cultural practices to manage pests with minimal chemical use. Efficient water management through drip irrigation and rainwater harvesting optimizes water use, protecting surrounding habitats supports vital ecosystem services like pollination. These findings demonstrate that a nutrient-blend dashboard is an effective tool for improving fruit set

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