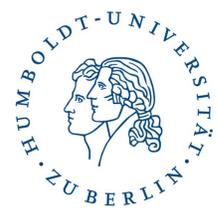




The nutritional composition of multiple defoliated *Amaranthus cruentus* plants



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Introduction

- *A. cruentus* is cultivated in Uganda mainly for grains^[1]
- Dual use (leaves and grains) could enhance the nutritional and economic value of the crop
- Little is known about how multiple defoliation affects leaf quality and grain production in a dual use system
- The nutrients and health promoting compounds of leaves from multiple defoliated plants were investigated

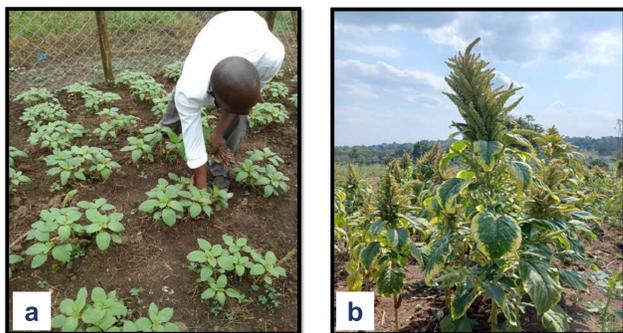


Figure showing Amaranth plants (a) at 3 weeks after sowing, (b) mature with grains

Methods

- Randomized complete block design (n=4)
- Defoliation at: 5, 7 and 9 weeks after sowing
- Defoliation frequency: Once, twice and none (control)
- Defoliation intensity: 50% leaves harvested
- Grain harvest: 12 weeks after sowing



- Fresh biomass
- Protein
- Carotenoids
- Chlorophyll
- Iron, zinc, calcium
- Total phenolics
- Flavonoids



- Grain yield
- Plant height
- Dried plant biomass

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Reference

[1] Aderibigbe, O. R., Ezekiel, O. O., Owolade, S. O., Korese, J. K., Sturm, B., & Hensel, O. (2022). Critical Reviews in Food Science and Nutrition, 62(3), 656-669

Results

- Carotenoids and flavonoids content increased with maturity; significantly reduced by multiple defoliation
- Protein content was not affected by defoliation frequency
- Iron content decreased with multiple defoliation in older plants
- Grain yield and plant height were not significantly affected by the timing and frequency of defoliation

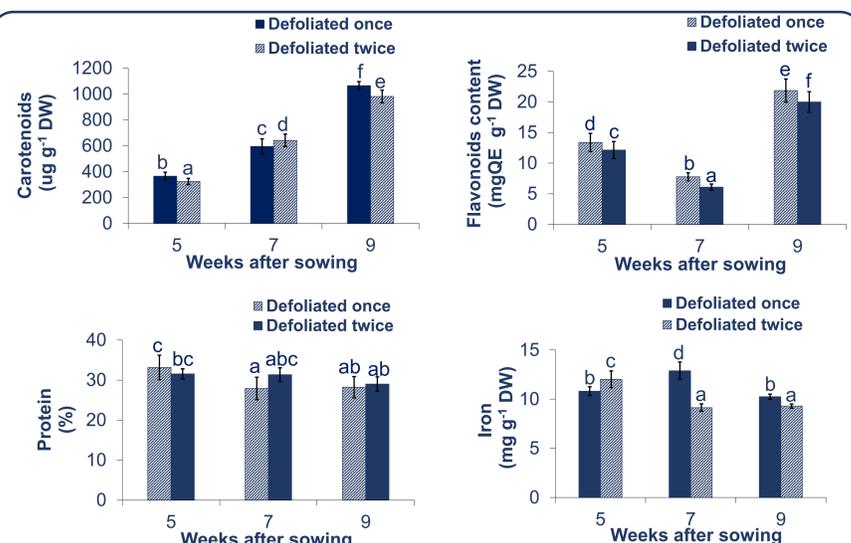


Table showing effect of defoliation on grain yield and plant height

	Defoliation frequency	5 Weeks	7 Weeks	9 Weeks
Grain yield (g/plant)	Control	58.50 ±10.79 ^a	56.30 ±11.91 ^a	60.46 ±11.37 ^a
	Once	65.83 ±12.50 ^a	61.26 ±16.38 ^a	70.80 ±15.96 ^a
	Twice	65.89 ±9.33 ^a	60.09 ±12.84 ^a	64.01 ±14.57 ^a
Plant height (cm)	Control	235.67 ±14.47 ^a	235.34 ±9.66 ^a	231.94 ±9.66 ^a
	Once	225.26 ±12.63 ^a	230.50 ±18.58 ^a	238.67 ±13.84 ^a
	Twice	226.41 ±18.22 ^a	224.43 ±17.59 ^a	231.79 ±18.31 ^a

^aValues in the same column are not significantly different (p ≤ 0.05)

Conclusion

- Defoliating 50% of leaves twice consecutively at 5, 7 and 9 weeks of maturity does not affect grain yield and plant growth
- Leaves of plants defoliated twice consecutively have higher iron content when harvested earlier, but higher carotenoids and flavonoids content when harvested later

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