Amaranthus Research Trends

David M. Brenner

North Central Regional Plant Introduction Station

Department of Agronomy, Iowa State University

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Outline

- Title & Genebank
- Outline
- Leafy vegetables
- Virus
- Genetics and taxonomy
- Defoliation, seed size, and flea beetle
- Urban farming
- Geosmin
- Fun images

Leafy vegetable amaranths in Africa as a protein source

Current knowledge on *Amaranthus* spp.: research avenues for improved nutritional value and yield in leafy amaranths in sub-Saharan Africa E. G Achigan-Dako, O. E. D. Sogbohossou, and P. Maundu Euphytica (2014) 197:303–317

Includes a good discussion of species level diversity.

Promoting competitiveness of neglected and underutilized crop species: comparative analysis of nutritional composition of indigenous and exotic leafy and fruit vegetables in Ghana D. Nyadanu • S. T. Lowor Genetic Resources and Crop Evolution (2015) 62:131–140

Mentions “In arid regions, the leaves are dried, processed into powder and used in sauces during the dry season”

Assessing the Effects of Drying on the Functional Properties and Protein Solubility of some Edible Tropical Leafy Vegetables

Aletor O.* and Abiodun A.R.

Department of Chemistry, The Federal University of Technology, P.M.B. 704, Akure, Ondo State, NIGERIA

Research Journal of Chemical Sciences Vol. **3(2),** 20-26, February **(2013)**

Part of a small body of information on leaves preserved by drying

Maintaining overall quality of fresh traditional leafy vegetables of Southern Africa during the postharvest chain

Bevly M. Mampholo, Dharini Sivakumar, and A. Keith Thompson

Department of Crop Sciences, Tshwane University of Technology, Pretoria West Campus, Pretoria, South Africa

FOOD REVIEWS INTERNATIONAL
2016, VOL. 32, NO. 4, 400–416
http://dx.doi.org/10.1080/87559129.2015.1094817

- Generally, 4 °C and humidity as close to 100% relative humidity (RH) as possible are the optimum storage conditions for leaf vegetables … that modified atmosphere packaging greatly extended their postharvest life, especially during cold storage.
- The application of modified atmosphere packaging will be beneficial to prevent or reduce the qualitative and the quantitative loss.

Amaranth sprouts and microgreens – a homestead vegetable production option to enhance food and nutrition security in the rural urban continuum

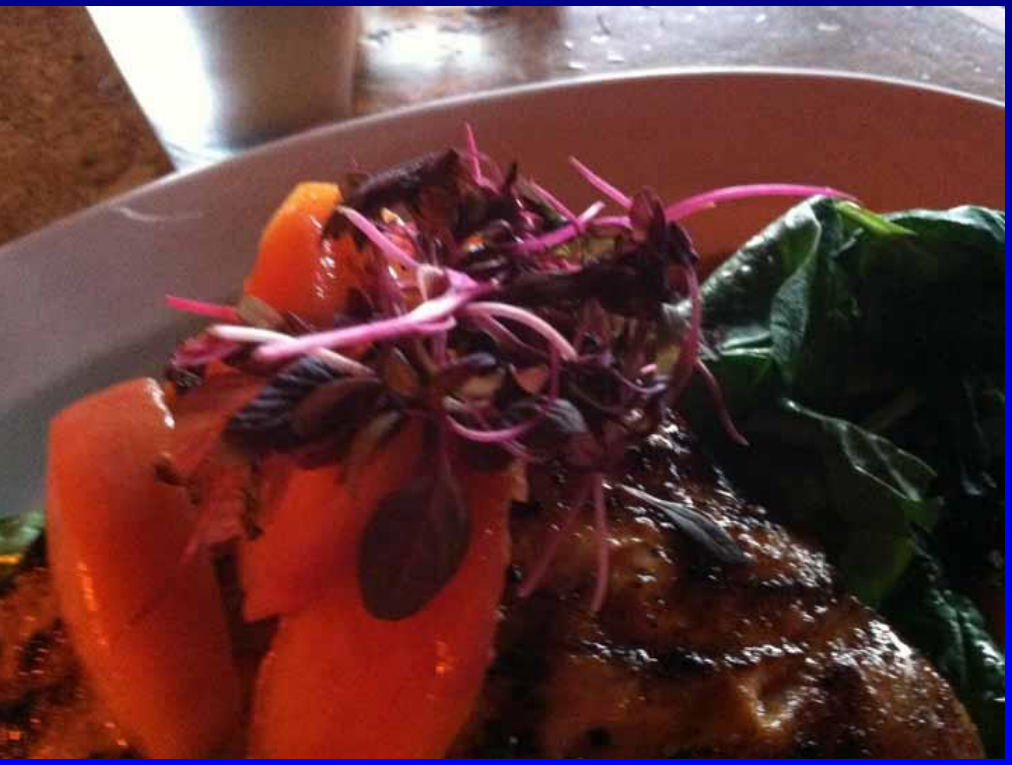
Ebert, A.W., T.H. Wu, and R.Y. Yang. 2015. Proceedings of the Regional Symposium on Sustaining Small-Scale Vegetable Production and Marketing Systems for Food and Nutrition Security (SEAVEG2014), 25–27 February 2014, Bangkok, Thailand Pages: 233–244

- specialty produce such as sprouts and microgreens with great potential to improve food and nutrition security
- From the AVRDC – The World Vegetable Center Taiwan

‘Red Garnet’ microgreens and cover crop

- Seed Savers inventory between 1998 and 2004
- market type, and the new standard check variety

Garnish



Joel Gruver’s cover crop experiment

Association of Papaya leaf curl virus with the leaf curl disease of grain amaranth (Amaranthus

A. Srivastava & M. Jaidi & S. Kumar & S. K. Raj & S. Shukla Phytoparasitica (2015) 43:97–101

(45% of plants in a Lucknow, India planting)

Amaranthus caudatus from India

113 accessions

- PI 481125 was originally misclassified as *A. caudatus* in the USDA Germplasm Resources Information Network and should be reclassified as *A. hypochondriacus*, as it clearly grouped with the other *A. hypochondriacus* accessions (and is treated as such in this research). Clouse et al. The Plant Genome 2016 doi: 10.3835/plantgenome2015.07.0062
- The first cluster was composed of 14 genotypes of *A. caudatus*. The remaining two accessions with codes 5 and 6 (PI 480816, PI 480854) were included in the second cluster consisting of genotypes of *A. hypochondriacus*. Štefúnová et al. Pak J Bot 2015 47:1293–1301
- Delineation example: Costea at al. Gen Res and Crop Evol 2006 53:1625–1633

Plan to redo cross for 100% male sterility from 2002

- 100% MS

PI 568125 X PI 568179

Crossing Methods and Cultivation Conditions for Rapid Production of Segregating Populations in Three Grain Amaranth Species

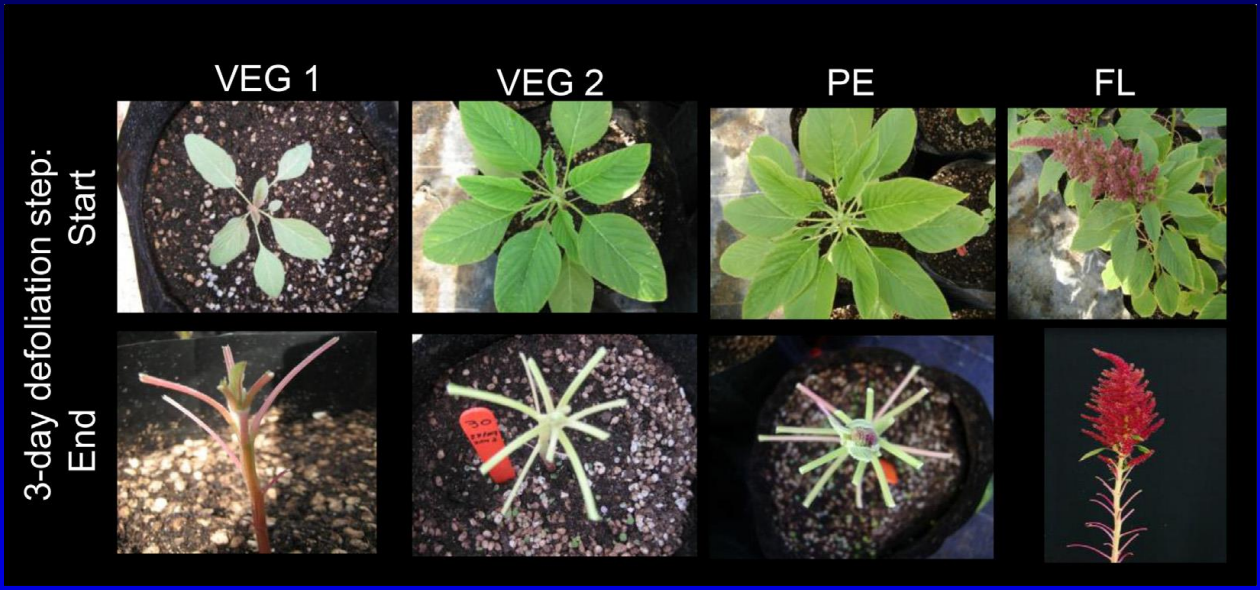
- Stetter, M.G., L. Zeitler, A. Steinhaus, K. Kroener M. Billjecki, and K.J. Schmid. Frontiers in Plant Science June 2016 Vol 7 Article 816

  - Hot water emasculation
  - Generation time of two months

The tolerance of grain amaranth (*Amaranthus cruentus* L.) to defoliation during vegetative growth is compromised during flowering

Erandi Vargas-Ortiz 1, John Paul Delano-Frier, Axel TiessenSeed

Plant Physiology and Biochemistry 91 (2015) 36−40



"the ability to reallocate stem starch and sucrose when needed, in combination with the activation of dormant meristems, that largely define the degree of defoliation compensation achieved"

- What would happen to seed size if 90% fls removed?

The amaranth flea beetle (*Disonycha glabrata*)

- An amaranth control boon for organic farmers
- Michael W. Palmer of Oklahoma State University alerted me about this

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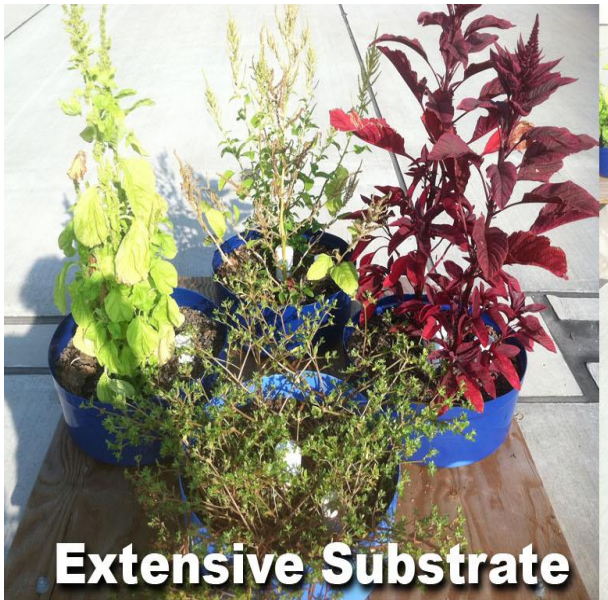
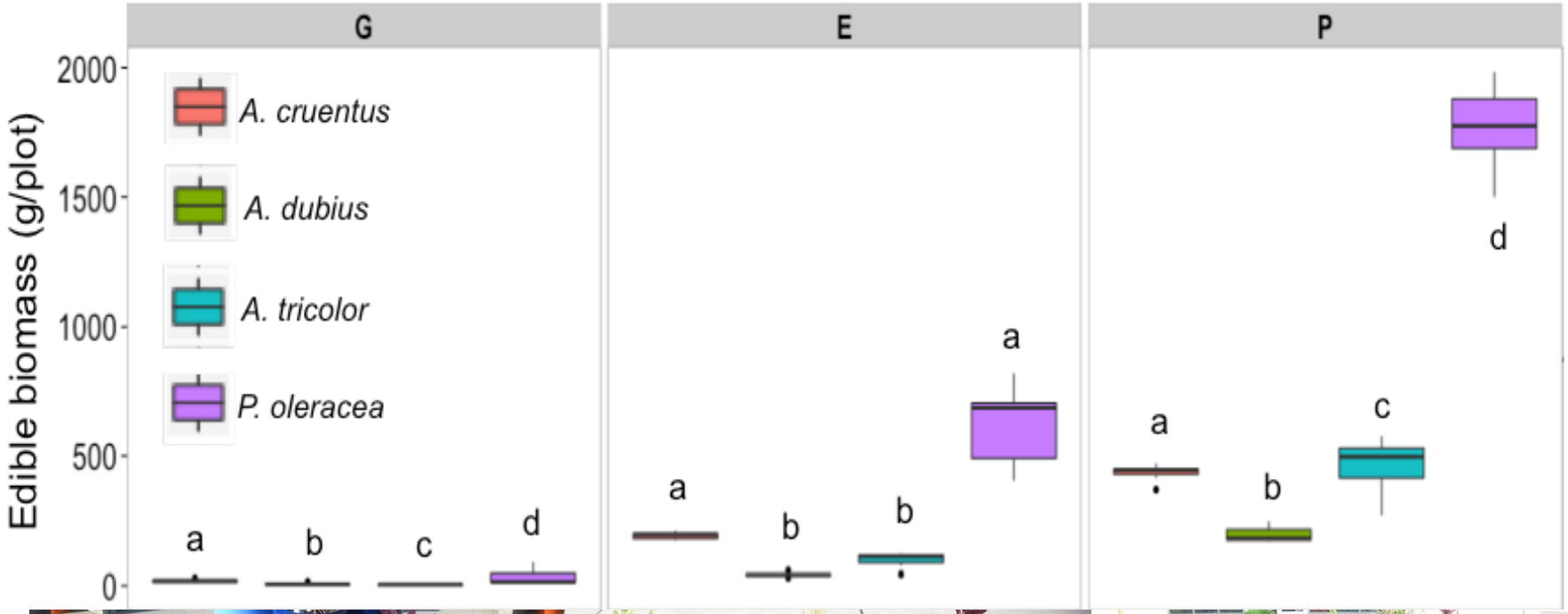
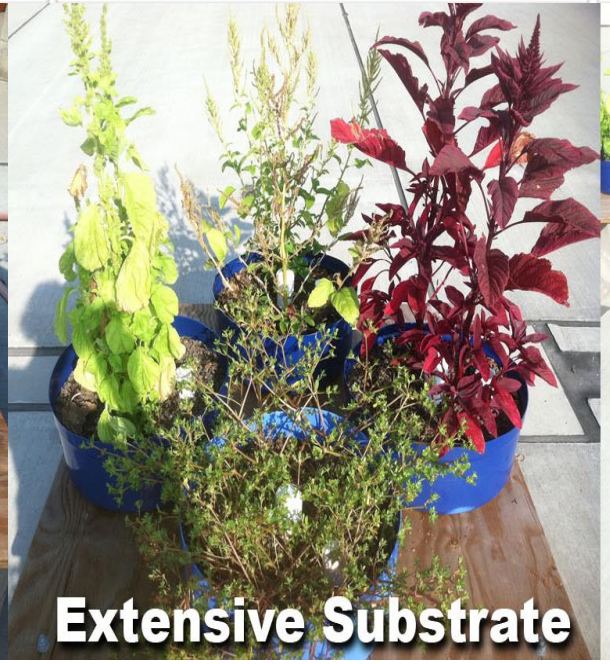
Crop species selection effects on stormwater runoff and edible biomass in an agricultural green roof microcosm

J.M. Aloisio[a,*], A.R. Tuininga[a,b], J.D. Lewis[a]

[a] Louis Calder Center – Biological Field Station and Department of Biological Sciences, Fordham University, P.O. Box 887, Armonk, NY 10504, USA
[b] PSEG Institute for Sustainability Studies – Montclair State University, 1 Normal Avenue, Montclair, NJ 07043, USA

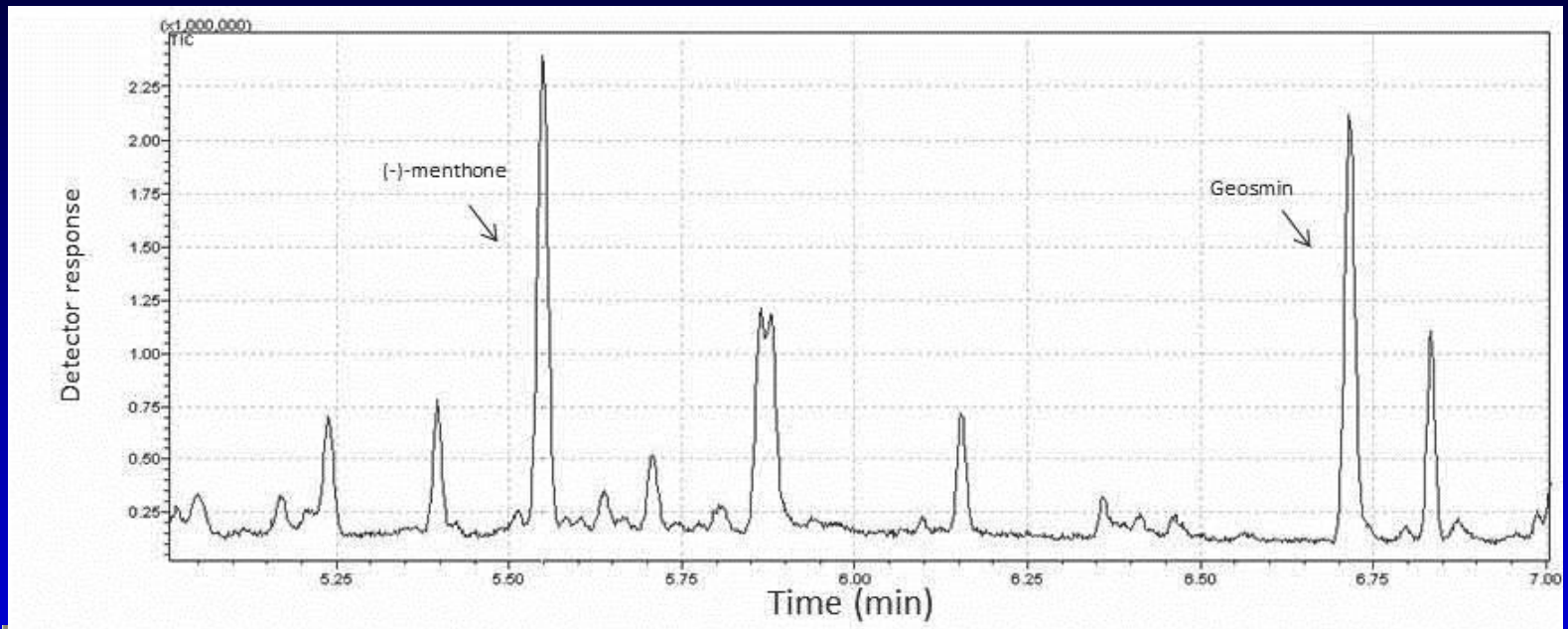






ANOVA – Tukey's HSD

Geosmin flavor in beets and related taxa Irwin Goldman



breeding for dwarf amaranths

National Plant Germplasm System United States Department of Agriculture, Agricultural Research Service

GRIN (our web site) http://www.ars-grin.gov/npgs/

- Preserve the genetic diversity of plants
- We distribute germplasm world wide, free of charge for research and development

The End

Amaranthus leaf protein

- Andini, R., S. Yoshida, and R. Ohsawa. 2013. Variation in protein content and amino acids in the leaves of grain, vegetable, and weedy types of amaranths. Agronomy 3:391-403.

Michael W. Palmer of Oklahoma

State University informed me about an insect pest on *Amaranthus*. The amaranth flea beetle (*Disonycha glabrata*) has only been a problem for his vegetable amaranth for a couple of years. It is in the same tribe as the cucumber beetle, and it looks similar. Palmer reports that the amaranth flea beetle destroys local wild amaranths. This beetle is not a problem for the related vegetable *Celosia*. After Palmer told me about the amaranth flea beetle; I remembered seeing cucumber beetles on amaranth leaves in Iowa, which may have been amaranth flea beetles. For now this insect is a boon to growers in Oklahoma with weedy amaranth infestations, and a problem for at least one vegetable amaranth enthusiast. In 2015 it was probably present, but not a problem in our amaranth field in Iowa.

Big Hearted amaranth