

What can be done to enhance seed and leaf production and consumption of vine spinach?



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References

- Grubben, G. H. J. and Denton, O. A., 2004. Plant Resources of Tropical Africa Vegetables. PROTA Foundation, Wageningen, Netherlands, Backhuys Publishers, Leiden, Netherlands/CTA, Wageningen, Netherlands
- Kumar, S., Prasad, A.K., Iyer, S.V. and Vaidya, S.K., 2013. Systematic pharmacognostical, photochemical and pharmacological review on an ethno medicinal plant, *Basella alba* L. Journal of pharmacognosy and phytotherapy 5 (4), 53-8, 2013.
- Abukutsa-Onyango, M.O. 2007. The Diversity of cultivated African Leafy Vegetables in three communities in western Kenya. African Journal of Food Agriculture, Nutrition and Development 7(3): 1-15.
- Abukutsa-Onyango, M.O. African Indigenous Vegetables in Kenya – Strategic Repositioning in the Horticultural Sector. www.researchgate.net/publication/235323508_African_indigenous_vegetables_in_Kenya. Accessed December 2020
- Rop, N.K, Mutui T.M. & Kiprop E.K., 2012. Influence of Nitrogen Fertilizer on the Growth, Yield and Quality of Indian Spinach (*Basella Alba* L.) Afr. J. Hort. Sci. (June 2012)

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Directorate of Research and Innovation
University of Eldoret
P.O Box 1125-30100
Eldoret
Website: www.uoeld.ac.ke
Email: ridirector@uoeld.ac.ke

Contacts:
Faith N W Maina
School of Agriculture and Biochemistry
Department of Agricultural Economics and Resource Management
E-mail : maina_faith@yahoo.com

QUALITY LEAF AND SEED PRODUCTION OF VINE SPINACH (*BASELLA ALBA* L. AND *RUBRA* L.) IN WESTERN KENYA

KEY MESSAGES

- Vine spinach ('Nderema') is an African Leafy Vegetables (ALV) that is an excellent source of calcium, iron, vitamin A, vitamin B9 and Vitamin C
- It is also good source of income
- Despite its nutritional and medicinal benefits, this crop is not included in the top ten priority African leafy vegetables for research in Kenya.
- The area under crop in Kenya has not been well established because it is semi domesticated and grows along fences.
- Vine spinach in Western Kenya is purely established from vines which means that new varieties cannot be created, low productivity is experienced and diseases are easily passed on to the next generation
- Use of seeds for propagation is virtually nonexistent in Kenya and this is attributed to non availability of seed forming varieties

POLICY RECOMMENDATIONS

- Extension service providers through MOALF&C can sensitize farmers on standardized farm practices which will help to domesticate the species
- Characterization of vine spinach types found in Western Kenya forms a basis for breeding work for research institutions
- To increase the production of this important ALV seed producing varieties can be introduced to farmers through institutions such as KARLO and MOALF&C
- To enhance availability of seeds public institutions (such as KARLO and Universities) and private seed companies can engage in seed production of vine spinach
- Adoption of seed producing varieties by farmers will help industrialize the crop which can be used for making dyes

What is vine spinach (*Basella alba* L. and *rubra* L.)?

Vine spinach known locally in Kenya as 'nderema' is an evergreen creeping plant with heart shaped leaves commonly used as a vegetable. It is a good source of calcium, iron, vitamin A, vitamin B9 and Vitamin C. ¹ It has medicinal properties derived from phytochemicals which have the ability to fight cancer, and cardiovascular diseases and has been used to treat headache, inflammation and ulcers. ² The juice from the berries are used as dyes in food cosmetic industries. ² Despite its nutritional, medicinal and industrial importance it has received little research attention in Kenya. ³ Current interventions to improve African leafy vegetables exist there are still gaps in seed delivery systems, breeding, conservation of less used varieties (vine spinach being one of those), commercialization, processing, value addition and product development ⁴ Various challenges that limit vine spinach production specifically are shown in Fig 1.

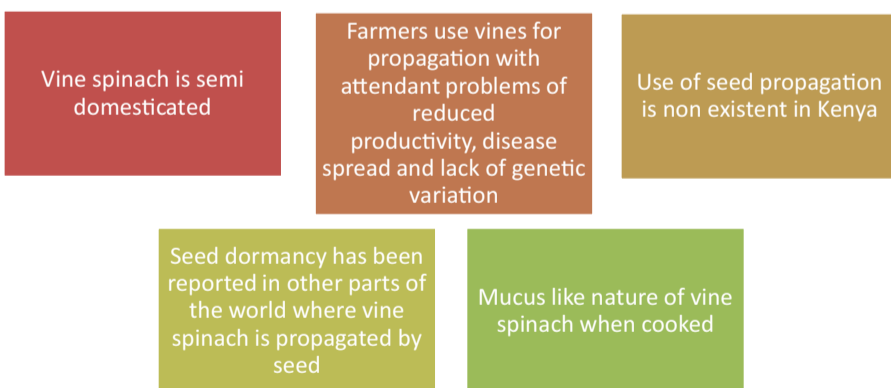


Figure 1 - Challenges facing production and consumption of vine spinach in Kenya

Characterization of vine spinach in Western Kenya

From our project 5 vine spinach types were identified.

Table 1 Summary of general characteristics of vine spinach types from Western Kenya

Character	Type				
	1	2	3	4	5 (obtained from Genebank Muguga)
Growth habit	Twining	Twining	Twining	Twining	Twining (initially bushy)
Stem color	Red	Dark Red	Green	Pink	Green
Stem shape	Round	Round	Round	Round	Angular
Stem node	Red	Green	Green	Pink	Green
Leaf color	Dark green	Dark green	Dark green	Light	Glossy Green
Leaf margin	Entire	Entire	Entire	Entire	Entire
Leaf shape	Ovate	Ovate	Ovate	Ovate	Oval
Petiole color	Red	Red	Green	Red	Green
Propagated by	vines	Vines	Vines	Vines	Seed

Farmers practices in Western Kenya

Findings from our survey in Kakamega and Kisii counties indicate majority of the farmers grew green leafed vine spinach (*Basella alba*), used vines to establish the plants, sourced the vines from their own farms, used organic but not inorganic fertilizers, used fences as a means of trellising the plants, did not observe any pests and diseases and harvested leaf once per week. Plant spacing and cooking methods varied considerably. Information obtained forms a basis for standardizing agronomic practices, provision of quality and nutritive ways preparing vine spinach for consumption.

Seed dormancy breaking

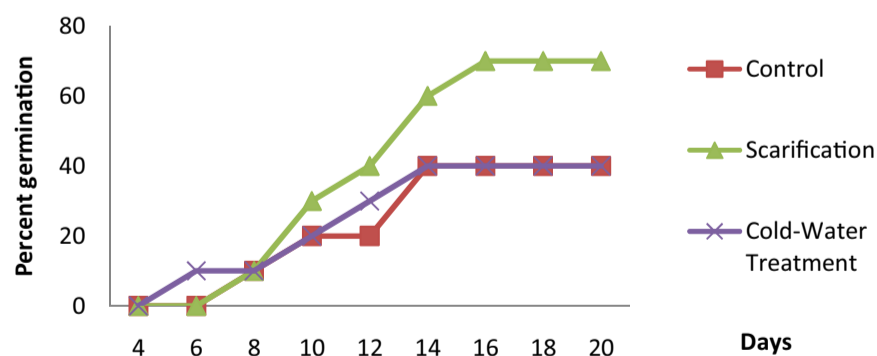


Figure 2: Germination of seeds that have undergone dormancy breaking methods

Mechanical scarification was the most effective method of breaking dormancy (percent germination of 70% - Figure 2).

Effect of organic and artificial Nitrogen fertilizer on plant characteristics of seed producing morphotype of Vine spinach

From our project cow manure gave significantly higher values for plant height, number of leaves, flowers and seeds as well as Thousand Seed Weight compared to the other fertilizer rates (0, 30, 60, 90, 120 kg/ha N).