

Domestication of the African vine *Cryptolepis sanguinolenta* for cultivation by smallholder African farmers

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Cryptolepis sanguinolenta is an African vine found across tropical regions of Africa, from Ghana to Tanzania. *C. sanguinolenta* is extensively used in Ghana in local herbal remedies to treat malaria. Currently *C. sanguinolenta* is collected from the wild, being dug up for its roots, where most of the anti-malaria active ingredient, cryptolepine is found. Consequently the plant is becoming harder to find and threaten with eradication from the wild.



This project is part of a collaboration with Dr Naalamle Amissah at the Uni. of Ghana, Legon, Ghana (www.niabinternational.org). Dr. Amissah maintains a collection of *C. sanguinolenta* plants held at the Uni. of Ghana, the roots of which will be assayed for their cryptolepine content at NIAB in an established HPLC assay. The cryptolepine levels will be analysed alongside morpho-agronomic characteristics collected by Dr. Amissah as part of a programme to select the best genotypes for domestication and subsequent release as varieties. Further work, which will form part of a 3 year PhD programme, will include generation of RADseq data on this *C. sanguinolenta* collection, and regression analysis of the cryptolepine and morpho-agronomic phenotypes against the genotypic marker data to identify the underlying genes responsible for the selected domestication traits.



During a sabbatical at NIAB Dr. Amissah identified a tissue culture media that significantly enhanced cryptolepine production in callus. Plants regenerated from this callus are maintained at NIAB. These plants have an enhanced sap colouration (wild-types are mainly yellow, while callus-derived plants are mainly red). The rotation project will also assess cryptolepine levels in the roots of these callus-derived plants to determine whether enhanced sap colouration translates into higher levels of cryptolepine in the roots. Further work will determine whether this somaclonal variation is transferrable through subsequent generations, or is purely epigenetic.

During the 3 year PhD project there will be an opportunity for the student to spend some time in Ghana working under the supervision of Dr. Amissah. Many aspects of the domestication process need to be addressed, including seed supply, and Dr. Amissah is carrying out studies to determine the best method of *C. sanguinolenta* propagation; seed, plantlets, root stock, etc. *In vitro*, anti-plasmodial activity tests of cryptolepine extracts, derived from callus and callus-derived plants will be carried out with collaborators at the Uni of Bradford.