



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

ETH Zurich DAGRL ZIL - RFPP - Current Fellowships - Cassava root and tuber scale

Towards the development of sustainable control options for the African root and tuber scale on cassava in Central Africa – understanding the ecology of the associated ant *Anoplolepis tenella*

Research Fellow

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Involved institution

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Anoplolepis tenella is a ground-dwelling ant species with widespread distribution in Central Africa. It is associated to the African root and tuber scale (ARTS) *Stictococcus vayssierei* Richard. A major effort is presently underway to identify and characterize biotic, agronomic, and environmental factors that affect ARTS abundance, and to develop sustainable practices for its management on cassava and other affected food crops. One of the key questions that must be addressed is the nature of the interactions between the ant *A. tenella* and ARTS, and the conditions that promote the abundance of *A. tenella*, which is the key factor contributing to the proliferation of ARTS in Central Africa. While the nature of the scale-ant relationship is not well understood, present evidence supports the hypothesis that the scale needs the ant to remove its honeydew secretions, as the scale would otherwise drown in its own secretions; and most likely to move crawlers within and between plants. As ARTS cannot survive without *A. tenella*, developing options to disrupt scale-ant association would effectively control damaging scale populations. Such efforts, however, require sufficient understanding of the biology and ecology of *A. tenella* and its impact on ARTS life cycle and ecology.

The research will revolve around three axes. In the first, we will determine the distribution and abundance of *A. tenella* and co-occurring ant species in three predominant vegetation types in the Forest Margins Benchmark of Cameroon, where the distribution and abundance of ARTS has been well studied. We will relate ant abundance and species composition to the relative abundance and prevalence of ARTS and other hemipteran insects that are tended by the ants, as well as abiotic factors such as ambient and soil temperature and rainfall. In the second axis and following the knowledge gained from the first axis, we will determine the nature of interactions by *A. tenella* and the predominant co-occurring ant species in the presence or absence of preferred food types. We will determine the impact of *A. tenella* and selected co-occurring ant species on ARTS development and survivorship, and conduct a farmer-participatory trial to determine the effects of ant exclusion on ARTS population size on cassava. In the third axis, we will determine the role of *A. tenella* workers and queens in ARTS dispersal. All the information obtained through the proposed research will feed into the larger program on cassava IPM with its broad aim of developing, with farmers participation, sustainable control options for reducing ARTS on cassava infestation in Central Africa; University of Basel Biogeographical research and IITA's Biodiversity research with its broad aim of documenting and conserving arthropod biodiversity in West and Central Africa.



Anoplolepis tenella worker



Infested cassava cutting



African root and tuber scale (Stictococcus vayssierei)



A. tenella nest







