

The *Chitoumou* dilemma

How to reconcile fruit and insect production in Sahelo-Sudanian agroforestry parklands

PERSON Stéphane (1), PAYNE Charlotte (2), LANTIERI-JULLIEN Rémi (3)
1 - Forest Goods Growing (forestgoodsgrowing@gmail.com), 2 - Department of Zoology, University of Cambridge (charlotte.payne@gmail.com), 3 – Polistes (jullienr@gmail.com).

Background

- Shea (*Vitellaria paradoxa*) trees are found in the shea belt, which ranges across sub-Saharan Africa.
- In many regions, this manifests as shea parklands – where shea trees and crops grow together.
- Chitoumou* (the shea caterpillar *Cirina butyrospermi*) feeds on shea trees and is used as food in many regions in the shea belt.
- Food insecurity is high in much of the shea belt region..

Methods

1. Interviews with stakeholders in the shea sector :
 - i. Actors involved in the production, marketing and distribution of shea products (butter & nuts) ,
 - ii. Smallholder farmers who cultivate land with shea trees and collect the shea caterpillars and shea nuts,
 - iii. Attendees at dedicated events, e.g. Insects to Feed the World 2018 (Wuhan, China).
2. Nonsystematic review of gray literature, technical reports and peer-reviewed published articles

1 No competition between shea caterpillar, shea and plant crop. Two consecutive years of field data suggest that tree defoliation by caterpillars has no effect on shea fruit yields, and that defoliation may have a positive effect on maize productivity (Payne & al.,2018).



Photo 1: Defoliation of an adult tree. The leaves grow back rapidly and the following year's yield does not seem to be affected - Photo Payne C..



Photo 2: Shea fruits, recently collected and ready for processing - Photo Payne C..

Results



Photo 3: adult caterpillar on a shea leaf.. - Photo Payne C..

2 Rich and inspiring previous experiences : There is a strong precedent for caterpillar farming associated with "forage" trees: sericulture, which uses the mulberry tree. In the 19th and 20th century in France, regular and severe pruning was recommended for the production of high quality forage (Claveirolle, 2003). Management of the forage resource can be imagined at different scales : at the individual or on stand-level, with specific and adapted management that facilitates the increase of foliar production over time. This may include offset harvest, pruning and pollarding techniques, and differentiated management.

3 Towards a form of breeding : Distributors of edible insects are increasingly using farmed sources (Müller et al 2016), and there are ongoing attempts to reed insects that have not previously been farmed (Hanboonsong et al 2013). There are also less intensive forms of breeding, also termed ‘semi-cultivation’, which range from nest protection as is done in Japan (Payne and Evans 2017), and transplantation practices to more favorable sites as is done in Central Africa (Latham, 2015), to some form of domestication and controlled breeding (Van Huis et al 2013). All types may have a significant positive effect on insect production by limiting for example predation losses (birds, ants, etc.) With a better knowledge of the reproduction cycle and in particular the triggering factors of pupation, this may also allow the realization of several cycles per year and increase production (Bama et al. 2018)



Photo 4 & 5 : Caterpillar eggs harvested in shea orchard and birth of young caterpillars Photo Payne C..

Discussion & conclusion

In many regions, finding a means of protein production that is compatible with the maintenance of tree cover is a major issue. Thus, better management of foliar production in agroforestry systems as an aerial forage resource specifically dedicated to insect farming opens important perspectives in terms of diversification and the promotion of new agroforestry practices.

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