Status of edible aroids in Cameroon

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Introduction

Cocoyam is an important staple food crop across many developing countries in Africa, Asia and the Pacific. It is particularly important in Sub-Saharan Africa where the two most commonly cultivated species (Colocasia esculenta and Xanthosoma sagittifolium) are grown extensively. The cultivation of cocoyam in most African countries is essentially by small-scale resource-poor farmers with minimal input. These crops play very important roles in the livelihood of rural farmers, for food and income. Generally, cocoyam is associated with other crops such as maize, banana, plantain, coffee and cocoa. Sole cropping is practised mostly for experimental purposes (Onyeka, 2014).

Fig. 1: Taro cultivation in Cameroon. a) mixed cropping system practised by farmers b) sole cropping practised by researchers

a) Taro

Taro leaf blight (TLB) is the most important taro disease worldwide. The most obvious and frequent symptom is a blight of the leaf lamina, followed by postharvest rot of the corms.
Leaves of susceptible varieties collapse in about 20 days compared to 40 days for non-infected plants. Therefore, photosynthesis is greatly reduced in susceptible plants, leading to progressively smaller leaves and corms. Corm rots usually develop rapidly after harvest and entire corms can decay in 7–10 days. The rots usually start from areas damaged at harvest when the petiole bases and suckers are removed, especially during or after wet, warm conditions.

In Cameroon, TLB caused 100 % yield losses in many production fields and an average of 80 % national production in 2010. At least, 413,051 t of taro tubers were lost, estimated at 107 million Euros. This led to price hikes from 203 to 762 euro/tonne and may be higher in some places like Kumba where the crop is extinct. Consequently, prices of some food crops also went up. Examples were yams, macabo, sweet potatoes and banana whose prices were increased by 33, 100, 40 and 140 %, respectively. The data presented here are in complete contradiction to information provided by Onyeka (2014). Field work and experience show that any source of information that does not accept the reduction in cocoyam production from 2009 may be considered false as many production basins have stop the production completely (Ntungwe, 2010; Mbong et al., 2013).

TLB epidemic in Cameroon can only be compared to earlier records in Western Samoa where 99 % of the taro exports were lost and only 0.5 % of their export figures remained within 2 years. More than 600 million people could be fed each year by halting the spread of fungal diseases in the world’s five most important crops alone.

**Management strategies**

1. **Fungicide application**

   Fungicide application remains the fastest and most effective means of TLB management. Trials were conducted to determine application frequencies with Plantomil (60% copper (II) oxide + metalaxyl) at 7-, 14-, 21- or 28-day interval. Disease severity increased faster on the control plots compared to the treated. The disease severity of all sprayed plots were significantly (P<0.05) lower than the control plots. All spray regimes gave higher yields than the control. Though the 28-day frequency gave the lowest yields, this fungicide application regime gave the highest net benefit and rate of return. In terms of sustainability, monthly application was therefore the best application interval using Plantomil at 3.33 kg active ingredient/ha. In economic terms, a farmer has a net benefit of 8 million FCFA with a rate of return of 13.78 (Tarla et al., 2014).

2. **Change of planting period (3 months)**
The crop was planted in December and irrigated using a motor pomp. Watering was conducted twice a week. The cost of irrigation was estimated at 1673 Euros per cropping season. The disease was significantly lower on the dry season crop compared to the rainy season crop. The dry season cultivation produced four times the quantity of tubers that rainy season crop produced. Yield loss attributable to TLB was therefore 75.83%. In economic terms, the farmer gains 18293 Euros a hectare with a rate of return of 11.29. All our field surveys have shown that farmers who cultivate taro in between November and December in swampy areas obtain good yields while rainy season cultivation has been abandoned. Irrigation has not been reported in any part of Cameroon as market gardeners prefer to irrigate vegetables. It should be noted that irrigation is more profitable for short cycle crops like vegetables compared to taro (Tarla et al., 2013).

3. **Resistance**

Common taro cultivars were collected from the Western Highlands of Cameroon and characterized following their petioles colour, blade size, spot on petiole junction, rhizome and lateral tubers, number of tubers per plant, yields and cycle. In order to obtain resistant cultivars, all these cultivars were grown in the same field (Table 1).

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Petiole</th>
<th>Blade size</th>
<th>Spot on petiole junction</th>
<th>Rhizome and lateral tubers</th>
<th>Mean tubers per plant</th>
<th>Yields (t/ha)</th>
<th>Cycle (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ehkoueh’deh</td>
<td>Violet</td>
<td>Average</td>
<td>Violet</td>
<td>Globulous, big, rounded at the apices</td>
<td>14</td>
<td>43.37</td>
<td>Intermediary early 8</td>
</tr>
<tr>
<td>Ehkwanc’fre</td>
<td>Light green</td>
<td>Large</td>
<td>Green</td>
<td>Cylindrical rhizomes with tapered lateral tubers of very big sizes</td>
<td>4</td>
<td>44.5</td>
<td>Late 9</td>
</tr>
<tr>
<td>Ehkoueh’lah</td>
<td>Light green</td>
<td>Small</td>
<td>Green</td>
<td>Small rhizomes with small lateral tubers tapered and rounded towards the apex</td>
<td>23</td>
<td>51.5</td>
<td>Intermediary early 8</td>
</tr>
<tr>
<td>Ibo coco</td>
<td>Dark green</td>
<td>Small</td>
<td>Violet</td>
<td>Globulous, rhizomes with oval lateral tubers</td>
<td>22</td>
<td>61.81</td>
<td>Early 7.5</td>
</tr>
</tbody>
</table>

Ibo coco cultivar gave the lowest yields due to TLB. The leaves and tubers of Ibo coco cultivar are consumed by more tribes in different forms than any other cultivar. In some tribes, Ibo coco is used for human consumption while the other three cultivars are reserved for animal feed (Table 2). The farm gate price used in this study was objective by attributing the lowest prices possible while taking Ehkoueh’deh and Ehkoueh’lah to be used for human consumption though many tribes do not consume them. In many parts of Cameroon, these three cultivars are not sold. Due to the short cycle of Ibo coco, many growers will prefer it as labour will be needed for a shorter period while the crop will be sold earlier. In Cameroon, where schools reopen in September, Ibo coco is very important in women empowerment as women sell the crop to assist their husbands in purchasing school materials for their siblings. It is also called paracetamol in some tribes because children who return from school could boil it as a remedy to hunger while waiting for their parents to cook in the evening (Tarla et al., 2013).
Table 2: Economic analysis of a change in planting period by 3 months before the rains

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Yields (t/ha)</th>
<th>Farm gate price (t/euro)</th>
<th>Total income (Euros)</th>
<th>Net income with respect to Ibo coco (Euros)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibo coco</td>
<td>14.94</td>
<td>304</td>
<td>4554</td>
<td>-</td>
</tr>
<tr>
<td>Ekwan’fre</td>
<td>17.57</td>
<td>203</td>
<td>3562</td>
<td>-1</td>
</tr>
<tr>
<td>Ehkoueh’deh</td>
<td>21.19</td>
<td>508</td>
<td>10756</td>
<td>9</td>
</tr>
<tr>
<td>Ehkoueh’lah</td>
<td>33.83</td>
<td>508</td>
<td>17173</td>
<td>19</td>
</tr>
</tbody>
</table>

Other cultural methods such as Crop rotation are used by farmers where land is available. Fallowing and planting of disease-free seeds is also practised.

b) Macabo

In Cameroon, Ghana and Gabon, macabo is a tuber crop that ranks second after cassava (Onyeka, 2014). It is cultivated in all the Agro-ecological zones of Cameroon, with the main producing areas being, the western highland (West and North West Regions), the humid forest (South West region), the Centre Region and the South Region. Two major varieties are cultivated in Cameroon: white and red. The white variety is high-yielding and contributes to more than 90% of the national production though it is more susceptible to cocoyam root rot disease (CRRD) which is the most destructive disease nationwide.

Macabo is cultivated for its tubers but almost all the plant parts (corms, cormels, flowers and leaves) are consumed. Besides providing food for human consumption, it is an important source of income for farmers (Reyes et al., 2005). In some regions of Cameroon, the prices of a 15 L bucket of cocoyam ranges between 2500 to 3000 Frs.

In spite of its numerous importances, its production in Africa represents only about 24% of the world production. Moreover, the national production of cocoyam has experienced a progressive decline over the past decades due to the root rot disease caused by the soil–borne pathogen, *Pythium myriotylium* Dreens which causes stunted growth, leaf yellowing and tuber yield reduction. About 90% of tuber yield losses in some infected fields in Cameroon has been reported (Nzietchueung, 1985).

Due to these reasons, a progressive drop in cocoyam production has been observed in most cocoyam producing areas (1.2 to 2.2 t/ha for crop association systems and 2.5 to 3.5 t/ha for sole cropping systems). In order to improve on productivity, farmers try to established cocoyam plantations on virgin soils yearly. Unfortunately, this production system is not sustainable due to land limitation (Nzietchueung, 1985). Therefore, a disease management strategy that can provide sustainable production of cocoyam is of utmost importance.

References
Azia T. effect of different compost types on cocoyam root rot caused by *Pythium myriotylium*. Master of Science Degree Thesis in Biotechnology and Plant Sciences, FAAS, University of Dschang. 2012


