Introduction

*Dioscorea hirtiflora* (*Lusala*) (Fig. 1) is a wild tuberous plant exploited for food by many people in southern Zambia with about 83, 96 and 59% of rural households collecting, consuming and selling tubers respectively (Zulu et al., 2019). This important plant is however threatened by overharvesting and deforestation. It has limited domestication in Zambia: a very few farmers establish plants from wild-harvested tubers in semi-natural forests (a form of agroforestry) near homesteads (Zulu et al., 2019). There is no published information on lusala propagation to inform and improve practices of these pioneer farmers.

Aims

To explore potential domestication and future *in situ* and *ex situ* genetic resources conservation through lusala propagation experiments.

Methods

Three propagation experiments were conducted between 2016 – 2018 in heated glasshouses at the Crop Environment Laboratory, University of Reading. Experiment 1 assessed the effect of planting tubers with or without visible shoot buds from three weight classes; Exp. 2 evaluated the influence of planting whole tubers or 20mm minisetts; and Exp. 3 assessed the effect of planting 10 and 20mm sections of different miniset types (proximal, middle and distal tuber parts), on sprouting and tuber yield.

Results

Most sprouting in all three experiments mainly occurred in November and December irrespective of planting date (Table 1).

<table>
<thead>
<tr>
<th>Date of planting</th>
<th>Sprouting period</th>
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<tbody>
<tr>
<td>Exp. 1</td>
<td>29 Nov 2016</td>
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<tr>
<td></td>
<td>Dec 2016 – Jan 2018</td>
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<tr>
<td>Exp. 2</td>
<td>26 Sept 2017</td>
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<td></td>
<td>Oct 2017 – Jan 2018</td>
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<tr>
<td>Exp. 3</td>
<td>25 Sept 2017</td>
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<td>Dec 2017 – Mar 2018</td>
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</tbody>
</table>

In Exp. 1, tubers planted with visible shoot buds had higher sprouting and yield (96 – 100%, 45.0g) than those without (18%, 10.4g) (Fig. 2).

![Fig 1: Lusala in the forest; B: Lusala tubers at a local market in Chongwe, Zambia; C: A woman trading in lusala tubers; D: Lusala propagation trial a glasshouse at the University of Reading, UK.](image)

In Exp. 2, whole tubers had greater sprouting and yield (96 – 100%, 71.5 - 92.5g) than 20mm long minisetts (33%, 8.3g). In Exp. 3, 10 and 20mm minisetts cut from proximal ends of tubers and 20mm from the middle section sprouted and yielded better (48 – 58%, 7.5 – 14.6g) than 10mm middle and 10 & 20mm distal minisetts (17 – 29%, 0.6 – 2.2g).

Conclusion

Lusala cultivation may be improved by planting 20mm proximal minisetts prepared from tubers with visible shoot buds, or whole tubers with visible shoot buds.

Future work

- To explore the genetic variation of wild lusala plants collected across Zambia using 16 published microsatellite (SSR) markers.
- To assemble a lusala chloroplast genome for future genomics research.

Reference


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