

Effect of tree stem diameter, date and intensity of tapping on frankincense yield of *Boswellia papyrifera* in the Nuba Mountains, Central Sudan

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Introduction

Boswellia papyrifera (Del.) Hochst. locally known as tarak-tarak is a native forest species in Central Sudan (Fig. 1). In the Nuba Mountains the species has a range of environmental and economic benefits to the rural communities. The up to 10 m height trees are tapped for the harvest of valuable frankincense (also called gum olibanum). Despite its importance very little scientific information is available to improve the tapping techniques and promote sustainable production.

Materials and Methods

A three factor randomized complete block experiment with three replications was set up in the Umabdalla natural forest reserve (11°40'N, 30°30'E) from October 2001 till May 2002. The first factor was tree stem diameter at 1.3 m height (dbh) at three different diameters (10–15 cm, 16–20 cm and >20 cm), the second factor was tapping date at three different times (October 7, October 15 and October 21) and the third factor was intensity of tapping at two levels (2 and 4 positions on the tree stem). Each treatment combination was assigned to three trees, making a total of 162 trees. Tree stems were tapped with the traditional tapping tool mengaf. The resin of each tree was collected, dried in the shade for ten days and weighed.



Figure 1. *B. papyrifera* tree in the Nuba Mountains (left) and exudated frankincense at a tapped stem (right).

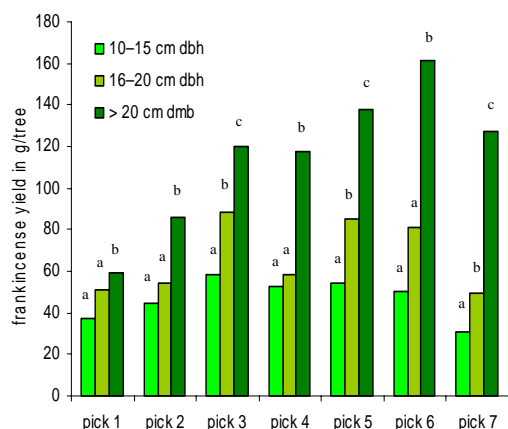


Figure 2. Effect of tree stem diameter at 1.3 m (dbh) on the frankincense yield of *B. papyrifera* trees. Means followed by different letters within one pick are significant different ($p < 0.05$) according to LSD.

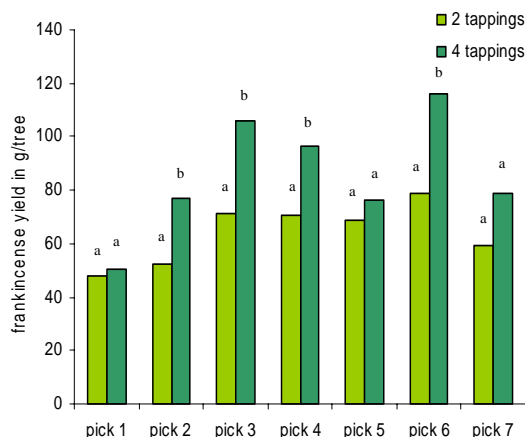


Figure 3. Effect of intensity of tapping on the frankincense yield of *B. papyrifera* trees. Means followed by different letters within one pick are significant different ($p < 0.05$) according to LSD.

Results and Conclusions

The results show that the dbh had a significant influence on the gum exudation of *B. papyrifera* trees (Fig. 2). The total gum yield of the 10–15 cm, 16–20 cm and >20 cm dbh trees was 328, 469 and 809 g tree⁻¹, respectively. Tree tapping on October 15 gave the highest resin yield with 575 g tree⁻¹ compared to tapping on October 7 and October 21 with 561 and 494 g tree⁻¹, respectively (Fig. 3). Increasing the tapping intensity from 2 to 4 positions caused an increase of resin by 25%.

In conclusion, our result clearly shows that resin yield of *B. papyrifera* can be improved by modifying the tapping techniques. However, it is also recommended that the tapping intensity should be on a sustainable level in order to minimize the likelihood of damaging the trees and to safeguard frankincense production in the future.

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