Impact of pruning intensities on cocoa tree productivity, mirid and black pod disease infestations on farmer field trials in Côte d’Ivoire

Kam-Rigne Laossi¹, Julie Lestang³, Siaka Koné¹, Marine Marchetti¹ & Pierre Broun²

1. ofi, Outspan Ivoire SA Côte d’Ivoire
2. NC2, Neom, Saudi Arabia
3. ETH Zurich, Switzerland

2022 International Symposium on Cocoa Research (ISCR), Montpellier, France
Background

➢ Pruning: Important agricultural practice for pest and disease control + enhancement of crop productivity

➢ Lack information on which pruning intensity optimizes cacao productivity, which pruning intensity for which agroecological zone (AEZ)

➢ Tested effects of 2 pruning intensities on cocoa productivity and in 2 AEZ

➢ Better understanding of pruning effects on cocoa productivity, for improved and tailored recommendations

➢ Update current recommendations based on trial findings
Material & methods

• Materials
  - Plantation ages: 10-15 years old
  - Planting material: hybrids
  - Trial site area: 0.29 Ha
  - Number of trial sites: 25 sites
  - 105 trees per site
  - 5 locations
  - 2 AEZ:
    - Evergreen forest
    - Deciduous forest areas
  - Duration: 2020-2022

• Methods
  - 5 replicates
  - Plot arrangement

Measurements

• Frequency: at every harvest
• Data collected:
  - N Healthy pods
  - N mirid infected pods (slightly curved + narrows at apical tip)
  - N black pods (1/3 covered by symptoms)
  - Pod size; N fresh beans per pod; Fresh bean weight
  - Dry bean yield

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Control (unpruned) + weeding + insecticide applications + fungicide applications</td>
</tr>
<tr>
<td>T2</td>
<td>Removal of 20% of secondary branches + sanitary pruning + weeding + insecticide applications + fungicide applications</td>
</tr>
<tr>
<td>T3</td>
<td>Removal of 40% of secondary branches + sanitary pruning + weeding + insecticide applications + fungicide applications</td>
</tr>
</tbody>
</table>
Key results: Pod health
Healthy and unhealthy pods per treatment (p<0.001)

- Pruning increased proportion of healthy pods (+5.62%) and decreased proportion of unhealthy ones (-52% to -60% for mirid infected pods and -43% to -45% for black pods)

→ Consistent trends over 2 years
Pruning increased total number of pods (+21.53% to 28.6%) and number of beans per pod (+5.9% to +8%)
Key results: Yield

Dry bean yield per treatment (p<0.001)

Pruning increased dry bean yield by about 100kg/ha (+20% increase) compared to unpruned

→ Consistent results over 2 years

Year 1: Significant difference between T2 and T3
- higher yield with 40% pruning in evergreen forest area
- higher yield with 20% pruning in deciduous forest area

Year 2: No significant difference between the 2 pruning treatments

→ T2 and T3 similar effects on productivity after 2 years of regular pruning
Key take aways and perspectives

• Consistent **yield increase** : +20% (+ 100 Kg/Ha)

• Consistent **reduction in mirid and black pod disease** infestation: up to -60% and – 45% respectively

• Increase pod/bean health : better final cocoa bean quality (low level of spoiled beans)

• **Gain for farmers** (with current price 900 XOF/Kg and 25000/Ha investment): **65 000 XOF/Ha**

• **Pruning=> contributes to increased income for farmer via yield increase, reduction of pest/disease infestation and better bean quality**

• Impact on farmer income and bean quality: **ofi** is currently **promoting and supporting adequate implementation of pruning and other GAPs**