

Effect of cocoa pod decomposition on earthworm density in agroforestry systems in the Dominican Republic

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# **1-Introduction**

> A common practice in the Dominican Republic and most cocoa producing countries is to leave the cocoa pod husks to decompose in piles on the plantation ground after the harvest.





 $\succ$  The aim of this study is to investigate the influence of this practice on earthworm density and morphological traits.

## **2- Material and methods**

#### **Earthworm sampling**

Selection of 24 plots distributed among 4 plantation age

> The Dominican Republic is the first exporter of certified organic cocoa worldwide and 100% of the national cocoa production comes from agroforestry systems (Notaro 2020).

# **3- Results and discussion**

 $\sim$  In every age class, the earthworm density was significantly higher under cocoa pods than under leaf litter (Fig 1).



Fig.1 Earthworm density under two types of soil cover, and among four

classes (0-3, 4-10, 11-25, >70 years).

Extraction and hand sorting of earthworms following the TSBF method: 25 cm x 25 cm soil monoliths at 20 cm depth (5 per plot).



Soil monolith extraction

#### **Morphological trait measures**

plantation age classes. Different letters show significant differences.

 $\succ$  In mature cacao plantations aged 11-25 years, the earthworm mean length was significantly higher under cocoa pods than under leaf litter (Fig 2).



- Fig.2 Earthworm mean length under two types of soil cover, and among four plantation age classes. Different letters show significant differences.
- The decomposition of cocoa pod husks, through increasing the

Earthworm density, body mass and individual length.

#### **Statistical analysis**

- General Linear Mixed Model selection following Akaike Information Criterion (AIC).
- Pairwise comparisons of marginal means SE for each modality.

#### References

Notaro, M., Deheuvels, O., Gary, C., 2020. Plant diversity and density in cocoa-based agroforestry systems: how farmers' income is affected in the Dominican Republic. Agroforestry Systems volume 94, pages 1071– 1084.

 density and mean length of the earthworms, may enhance the ecological functions that they provide.

### 4- Conclusion

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We highlighted the ecological benefits of piling up cocoa pod husks inside the plantation during the main productive phase • of the cacao trees. These benefits may be mitigated by the potential attractive role of cocoa pod husks for pests and diseases.





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