

Causes of fruit loss pre- and post-harvest in organic export banana systems among organic banana growers in Peru, Ecuador and Dominican Republic

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INTRODUCTION

Export quality standards for organic bananas follow the technical specifications developed for conventional bananas. In both cases, tolerance is minimal or zero for cosmetic damage, and for fruit diameter and length.



In recent years in organic banana producing regions such as Peru and Ecuador have reported an increase of up to 30% fruit discarded as a result of red rust, caused by Thrip attacks (*Chaetanaphothrips signipennis*). This insect damages finger surfaces in the early days of cluster development, developing into more visible red stains. Sometimes hands or the entire cluster are discarded.



Organic production is a challenge for banana smallholders, especially when new pests appear and control is difficult and expensive and where field prevention practices need developing or strengthening. In conventional production, synthetic pesticides compromise environment and human health.

OBJECTIVES

- Determine pre- / postharvest fruit damage including Thrip-initiated red rust.
- Develop methodology for identifying /quantifying main causes of organic banana fruit rejection prior to processing, allowing real-time decision making.
- Develop baseline for organic banana producers from Peru, Ecuador and Dominican Republic

METHODOLOGY

- A procedure was developed to assess the damage and resulting fruit loss in the field and processing stage by type of damage - physical, chemical or biological.
- In each country, grower fields linked to fruit quality problems and high levels of fruit rejection were selected.
- For each field, 20 clusters of 8, 9, 10 and 11 weeks were selected; weekly evaluations recorded finger damage.
- In the processing stage 20 labeled bunches were re-tested to identify new damage; these clusters were processed in the packing. The discarded fruit was evaluated according to quality parameters including process volume level and was finally classified for different types of damage (mechanical, physical, biological and physiological) also identifying the possible cause(s).
- This allowed us to identify the type of damage and its causes, and quantify the fruit discarded in each packing process.



LOST FRUIT WORKBOOK

Cluster	Week	Damage Type	Percentage
1	8	Red Rust	15%
2	9	Yellow Spot	10%
3	10	Latex	12%
4	11	Wounding	4%

Cluster	Week	Damage Type	Percentage
5	8	Scarring	8%
6	9	Distortion	2%
7	10	Bruising	14%
8	11	Touch	6%

Selection 20 bunches per producer selected at:

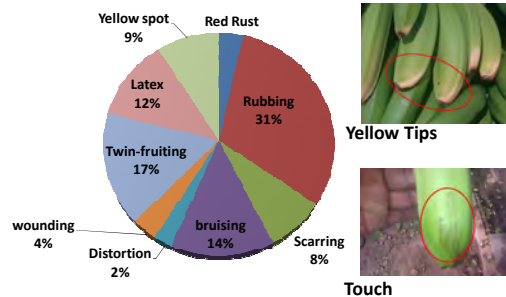
- 8 weeks
- 9 weeks
- 10 weeks
- 11 weeks

RESULTS

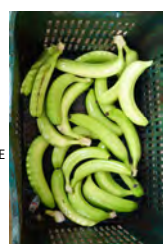
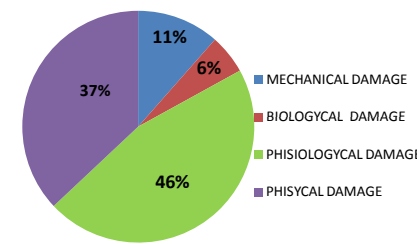
Results from the three countries at this early stage of research identify nine (09) causes that increase the percentage of rejections after processing. Graphic No. 01 shows that the cause "Rubbing" is dominant, followed by blow, twins, and others.

Graphic No. 02 shows that the predominant damage physiological and biological damage is 6%, the least important.

Graphic N° 001 - Causes of loss of fruit



Graphic N° 002 - Main causes of discarding banana



CAUSES OF LOSS OF FRUIT:

- MECHANICAL DAMAGE
- PHYSIOLOGICAL DAMAGE
- BIOLOGICAL DAMAGE
- PHYSICAL DAMAGE

CONCLUSIONS

- While this work was motivated by an interest to quantify fruit losses from red rust was caused losses of fruit, the study showed that the main loss of fruit in the packing was caused more by mechanical damage.
- Technicians from producer organizations should conduct a field audit to assess the efficacy of protection work.
- At packing level, most organizations did not have a procedure for evaluating losses and their causes.
- If there is no fruit-loss assessment of fruit in each packing step, we cannot make decisions in real time and make recommendations to minimize fruit losses affecting banana producer income.
- A next step will be to complete the methodology design and work on developing a mobile application where the field technician to input data and the application can analyze and issue an immediate result for decision making in real time.

ACKNOWLEDGEMENTS

Our thanks to the different smallholder organic banana producer organizations from Ecuador, Dominican Republic and Peru who participated in this research. For producers of organic banana it is a daily challenge to produce quality fruit.