The post-harvest quality of bananas is determined by pre-harvest factors

ANTHRACNOSE of bananas, caused by Colletotrichum musae *and crown rot of bananas, caused by a broad unspecific parasitic complex, are the most important post-harvest diseases affecting the quality of exported bananas. These diseases develop during fruit transportation, conservation, ripening and marketing.*

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Crown rot

Anthracnose

Like for most post-harvest diseases, the control of these diseases relies mainly on post-harvest practices like fungicide applications, fruit handling, cooling, CA or MA… Nevertheless, the regular observation of seasonal **(figure 1 et 2)** and spatial **(figure 1)** variations in the performance of these practices highlights the strong influence of pre-harvest factors. These pre-harvest factors determine a fruit potential quality that is elaborated at field level **(figure 3)**. This potential of fruit quality is constituted by a physiological component (the fruit susceptibility) and by a parasitic component (the level of fruit contamination).

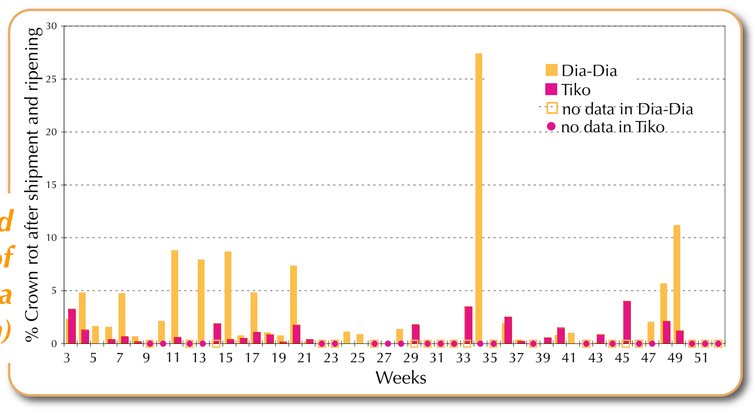

Figure 1. Evolution of crown rot on untreated bananas exported from 2 banana plantations of Cameroon in 2006 (estimation over 900 banana clusters/week/plantation)

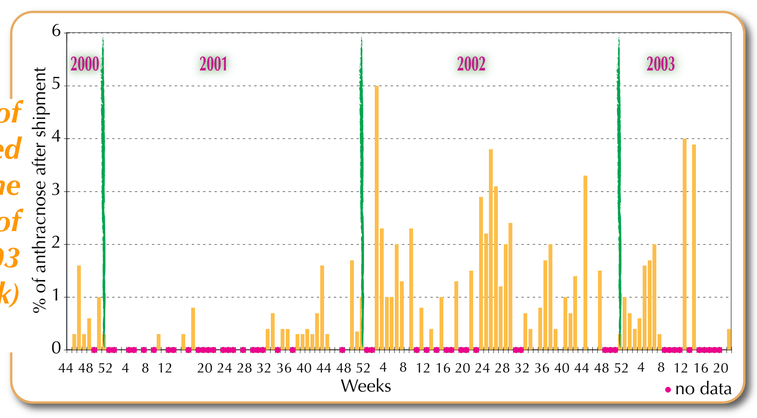

Figure 2. Evolution of anthracnose on fungicide treated bananas exported from one banana plantation of Guadeloupe from 2000 to 2003 (estimation over 250 fruits/week)

Figure 3. Elaboration of fruit quality

Pre-harvest factors influence the parasitic component of the fruit potential quality

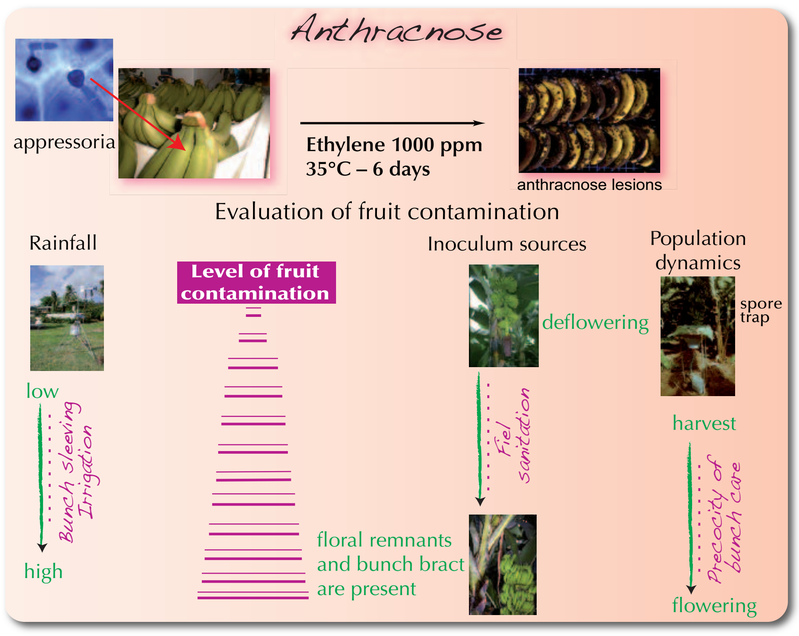

Figure 4. The parasitic component

- The parasitic component is defined as the level of fruit contamination by the pathogens. In the case of anthracnose, this level is the quantity of quiescent appressoria at the fruit surface and a specific method has been established for quantitative assessment before harvest (1).
- It has been shown that floral remnants are the main inoculum sources for fruit contamination by *Colletotrichum musae* (2, 3).
- Most contaminations occur very early in the field, during the first month of bunch emergence (2, 3).
- Rainwater is essential for the dissemination of conidia, so the early protection of bunches with a plastic sleeve reduces strongly fruit contamination (3,4).

Pre-harvest factors influence the physiologic component of the fruit potential quality

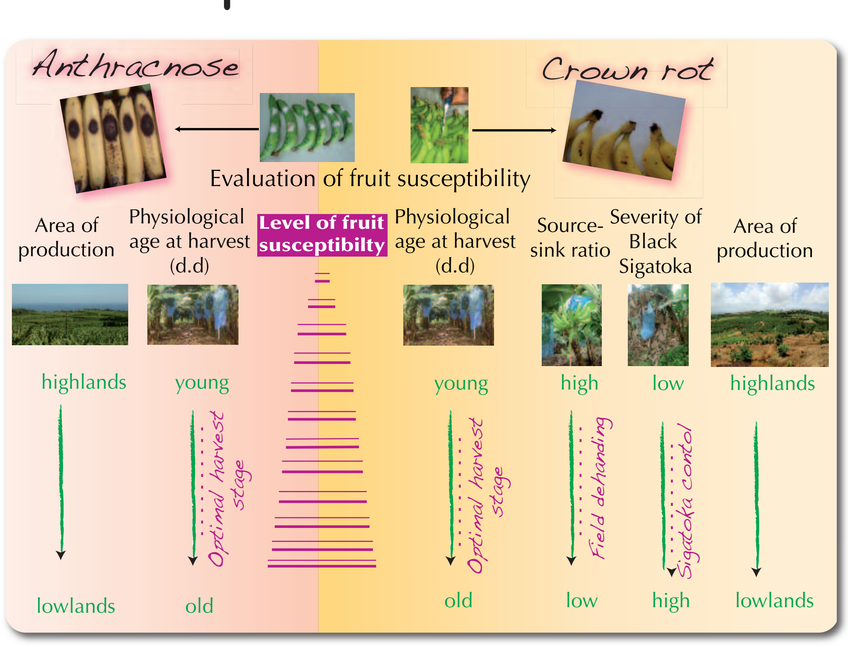

Figure 5. The physiological component

- The physiologic component is defined as the level of fruit susceptibility to the post-harvest diseases and is evaluated through artificial inoculations (5).
- Fruit grown in highland areas are less susceptible to anthracnose (6,8) and also to crown rot than fruit grown in lowland areas.
- The physiological age of fruit at harvest has a strong influence on fruit susceptibility to both diseases: the youngest the fruits, the less susceptible (7,8).
- The modification of source-sink ratio (fruit trimming), influences fruit susceptibility to crown rot but has no influence on fruit susceptibility to anthracnose (6).
- The level of development of Black Sigotoka (a fungal foliar disease) also affects the level of fruit susceptibility to crown rot.

Publications

(1) de Lapeyre de Bellaire L., Chillet M., Mourichon X. 2000. Elaboration of an early quantification method of quiescent infections of *Colletotrichum musae* on bananas. Plant Disease, 84 (2) : 128-133.

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(3) de Lapeyre de Bellaire L., Chillet M., Dubois C., Mourichon X. 2000. Importance of different sources of inoculum and dispersal methods of conidia of *Colletotrichum musae,* the causal agent of banana anthracnose, for fruit contamination. *Plant Pathology* (49) : 782-790.

(4) Mouen Bedimo J.A., Chillet M., Jullien A., de Lapeyre de Bellaire L. 2003. Le gainage précoce des régimes de bananes améliore la croissance des fruits et leur état sanitaire vis-à-vis de l'anthracnose *(Colletotrichum musae). Fruits,* 58 (2) : 71-81.

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(8) Chillet M., Hubert O., de Lapeyre de Bellaire L. 2007. Relationship between physiological age, ripening and susceptibility of banana to wound anthracnose. *Crop protection,* 26 (7) : 1078-1082.

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