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Cocoa Yield Development in Alto Beni, Bolivia: Influence of Sites, Varieties and Years

Background

- Essential limiting factors of cocoa productivity are pests and diseases.
- To develop control measures for organic cocoa producers, knowledge of yield development and pest and disease dynamics are important.

Objective

- Address problems of cocoa producers in Alto Beni, Bolivia, with a Participatory Technology Development (PTD) approach.

Material and methods

- Problems identified by farmers' survey:
  1. Pests, i.e. cocoa mirid (Monalonion dissimulatum), and diseases, i.e. frosty pod rot (Moniliophthora roreri) and black pod (Phytophthora spp.).
  2. No reliable recommendations about varieties and field management.
- Trials to address problems:
  1. On-farm trials assessing 16 cocoa varieties (established in 2004). Production system: simple organic agroforestry system with cocoa, zero external input.
  2. Documentation of best practices of four successful cocoa farmers (2012 only). Production system: simple to complex organic agroforestry system with low to zero external input.

Results

- In area IIb of Alto Beni (site: "Brecha F"), local selections IIa 58, III 06 and III 13 show both highest productivity and most rapid yield development (Figure 1).
- IIa 58, III 06 and III 13 produce > 75% of their yield until end of June (half month 12) thus they escape the 2nd peak of pests and diseases incidences in the half month 15 (Figure 1B).
- With good practices, one can produce more than 1 t ha^{-1} of organic cocoa beans (Figure 2).
- Cocoa mirid, and the in Alto Beni novel disease frosty pod rot, can cause up to 50% loss of harvest (Figure 2) despite following good practices.

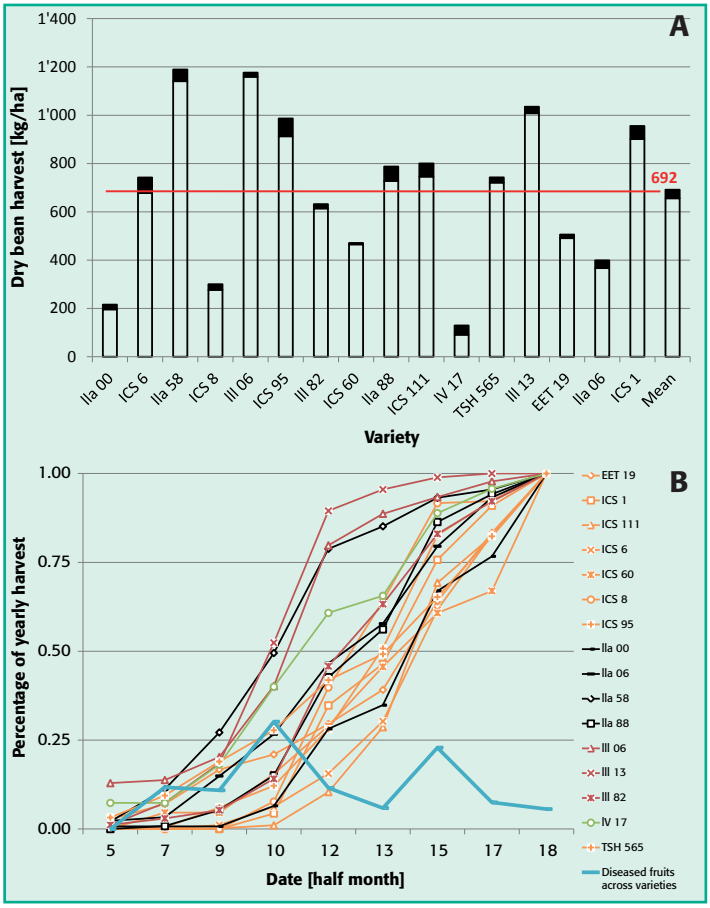

Figure 1: Assessment of 16 cocoa varieties in area IIa of Alto Beni, Bolivia, 2011; A: Productivity, red line = average of 16 varieties, closed bars are beans from partly diseased fruits marketed as 2nd quality. B: Precocity and pest and disease dynamics, orange lines are introduced clones, black, red and green lines are local selections of areas IIa, III and IV of Alto Beni, respectively; Dates are displayed as half months, i.e. 5 = 1st half of March, 7 = 1st half of April, etc.

Conclusions/Outlook

- For area IIb, varieties IIa 58, III 06 and III 13 seem to be promising to achieve high yields with little losses due to pests and diseases incidences.
- Replication of the trials in different years and weather conditions are essential to make our results more solid.
- Variety recommendations cannot be made until there are results about susceptibility to the novel disease frosty pod rot.
- The development of organic pest and disease control measures is essential to sustain productivity of organic cocoa farmers.

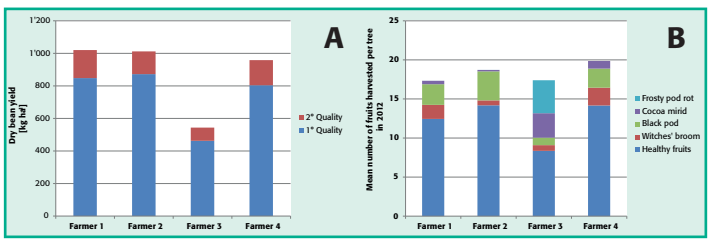

Figure 2: Cocoa harvest (A) and number of healthy and diseased fruits harvested per tree (B) in four high yielding farmers' fields, Alto Beni, Bolivia, 2012.

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