

Plant production by somatic embryogenesis from genotypes selected for agronomic traits in Ivory Coast and Ecuador

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THE use of clonal varieties becomes more and more important for cocoa breeding and culture. Several vegetative propagation techniques are available: cutting, grafting and somatic embryogenesis, each one with specific advantages and disadvantages. The aim of Firclone project is to compare the clonal production by these three methods and the performance of these plants in the field.

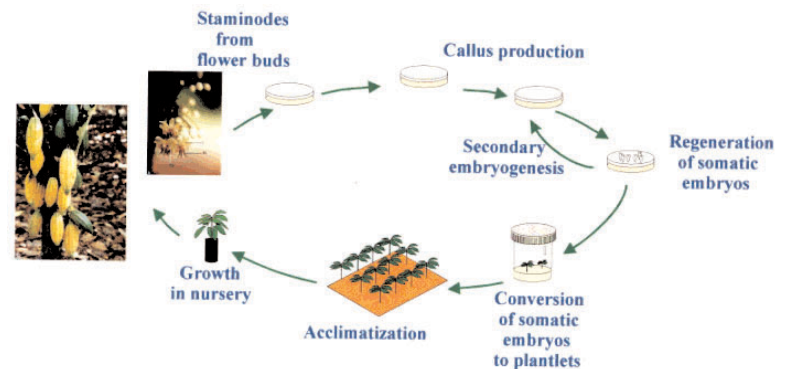
Material and methods

Plant material

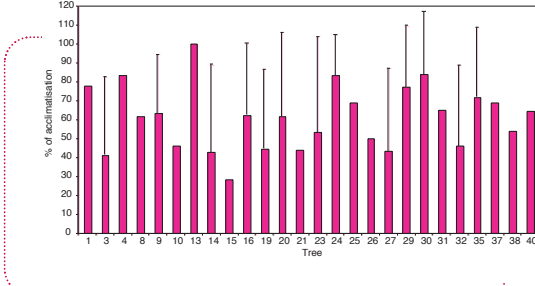
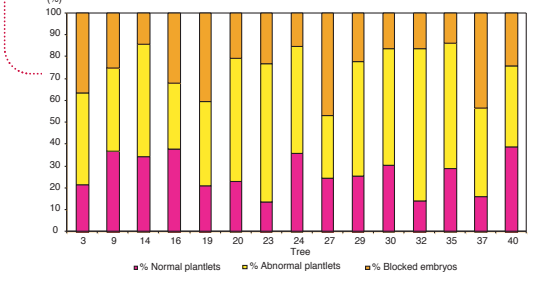
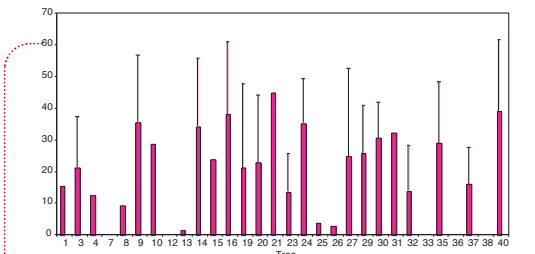
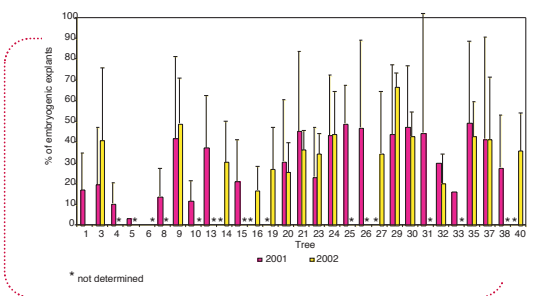
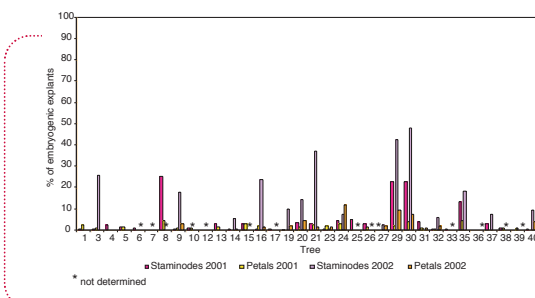
In each country, 40 trees (Ivory Coast, IC) or clones (Ecuador, E) were selected regarding vigour and productivity (IC), and aromatic traits and resistance to witches' broom (E).

Somatic embryogenesis

Somatic embryos derived plantlets were produced according Li *et al.* (1998) protocol. The plants for IC field trial were produced in CIRAD laboratory, and those for E field trial in INIAP laboratory.



Ivory Coast



Results

Primary somatic embryogenesis

With material from IC, staminodes had a significant higher embryogenic response than petals. That was the opposite with material from E where petals showed a significant higher embryogenic capacity. Embryogenic response was strongly variable according to the trees and to the period of culture (for IC). It was higher with material coming from Ecuador. In both locations, some genotypes did not produce any somatic embryos.

Secondary somatic embryogenesis

Secondary embryogenesis was significantly higher than primary somatic embryogenesis, either with materials from IC or E. However, response was still variable among genotypes, and according to the date of cultures. A minority of genotypes did not produce secondary somatic embryos. Like primary somatic embryogenesis, secondary somatic embryogenesis was more efficient with material from E.

Conversion into plantlets

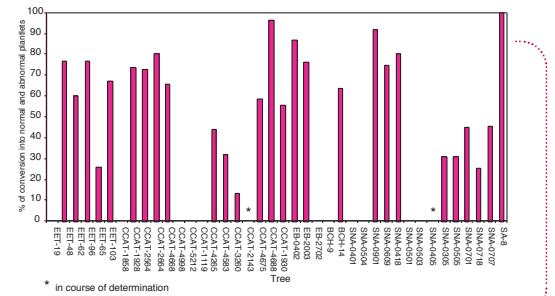
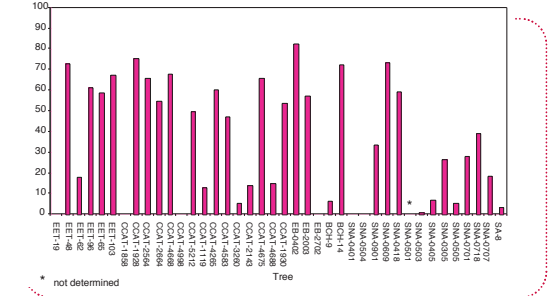
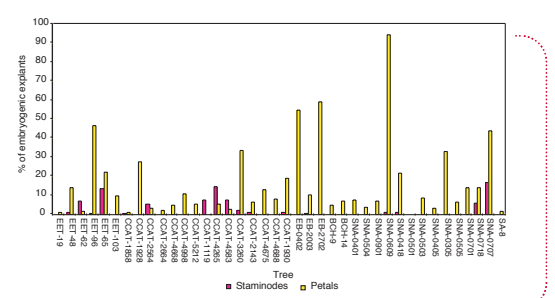
A majority of somatic embryos were able to convert into plantlets. However, a high percentage of such plants are abnormal: the shoot apex produced small and thick leaves, and growth quickly stopped. In E, rates of conversion of the somatic embryos were higher than with material from IC, however, within such plants, normal and abnormal plantlets are under determination. In both locations, somatic embryos of some genotypes never converted into plantlets.



Acclimatization

Rates of acclimatization were variable among genotypes but they did not go below 30%. Clearly, this step was more efficient in E than in Montpellier, probably because of the tropical climate.

Ecuador



Conclusion

This study shows the validity of this somatic embryogenesis technique to produce plants for experimental field trials. Among the 40 selected clones, with interesting agronomic traits, it has been possible to produce somatic embryos and plants from the majority of them. However, some genotypes remain recalcitrant. Production in Ecuador was more efficient than the one from Ivory Coast/France, probably because of the proximity between the field and the laboratory, and also, the tropical environment. In 2004, both field trials will be planted in each country with 10 chosen genotypes as well as two common controls: Sca-6 and IMC 67.

