



Participatory Cotton Breeding in Benin

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ABSTRACT

A cotton improvement programme based on participatory plant breeding methods employed for food crops has been implemented in Benin for the last two years. It aims at reinforcing the relationship between farmers and research, regionalising cotton breeding thanks to active collaboration with grower associations. Hopefully, farmers will also develop skills in seed production. First results confirm the variability in a breeding population created in 1996 by intercrossing fourteen genotypes, representing a wide range of variability. The interest shown by breeder-farmers looks intact with willingness to continue with this partnership. In order to ensure that it will endure, contracts with farmers are being considered.

Introduction

Cotton breeding in French speaking Africa has been successful in transmitting improved genetic material to farmers. The breeder has played a leading role in developing new varieties to match all user requirements. However, the cotton research environment is changing. In particular state disengagement brings in new partners and the producers, through their professional organizations, tend to become major players in the cotton industry (Cuzon, 1997). In this context, seed may not be distributed free any more and a new market could open-up in the region.

By initiating participatory cotton breeding (Lançon, 1998), Benin research intends to strengthen links with producers and to open the way to future partnerships. For the short term, three objectives are targeted :

- 1) improving the information flow between producers and researchers;
- 2) taking account of the genotype x environment interactions through several breeding sites;
- 3) preparing transfer of information towards potential seed producers (Ashby *et al.*, 1995).

Material and methods

A highly variable population is grown in three different environments where selection pressure may vary. This population was constituted by inter-crossing 14 genotypes of various origins (West and Central Africa, USA, Argentina and Australia) chosen for their morphological appearance and their agronomic and technological performances.

In each of the three main cotton producing areas (Zou, Borgou and Atacora), a cotton grower is selected by his producer organization to take the responsibility of co-ordinating the breeding work.

Each breeding cycle involves 1) field screening by the grower-breeder alone or in collaboration with a group of other cotton growers and 2) selection of the best plants on individual performances, carried out by the research-breeder in collaboration with the producers.

All the selected populations are compared with the original population and samples of this population that are multiplied in a neighbouring research field with no conscious selection.

After several cycles, the selected genotypes are either inter-crossed to generate new variability (recurrent selection) or tested as progenies.

Preliminary results

After a year of collaborative breeding, producers organizations and grower-breeders keep interest in the activity. The performances of the best selected plants indicate that it is possible to expect satisfactory genetic progress from each of the 3 populations. It also appears that selection pressure depends upon the level of the trait observed in a given environment.

Conclusion

The relationship between research and producers has grown in confidence. However, the program is too young and the genetic results too few to evaluate the methodology used. To help this activity last beyond the term of the project, it looks necessary to institutionalize it, for example by creating a co-ordinating group led by one of the grower-breeders.

References

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Table 1. Parents of the PPB population .

Genotypes	Origin	Specific traits
Stam 18A *	Ivory-Coast	yield potential
H 279-1 *	Togo	fiber quality
H 279A *	Benin	adapted to local conditions
Irma 772 *	Cameroon	earliness, ginning out-turn, fiber quality
Irma Z856 *	Cameroon	yield potential
Irma BLT-PF *	Cameroon	fiber length and fiber quality
G 440 *	Senegal	ginning out-turn and fiber quality
Deltapine 90	USA	yield potential
DES 119	USA	boll bearing variability
Stoneville 907ne	USA	earliness
Stoneville 324	USA	earliness
Sicala 34	Australia	agronomic traits
Guazuncho II	Argentina	boll bearing
Chaco 520	Argentina	earliness

Source: after Lançon *et al.*, 1997

* variety obtained in collaboration with CIRAD

Table 2. Mean value of the populations selected through participatory breeding at three locations compared with a population obtained by conventional breeding.

	PPP g	Gin %	SI g/100	UHML mm	STP8 g/tex	PM %	Hs mtex	+b
Kandi-Borgou (53 plants)	125.5 ± 35.1	43.7 ± 2.1	9.0 ± 0.8	29.7 ± 1.2	31.7 ± 1.7	83.3 ± 3.0	182 ± 12	7.5 ± 0.6
Djougou-Atacora (48 plants)	70.8 ± 17.0	43.1 ± 2.1	9.0 ± 0.8	29.8 ± 1.1	30.6 ± 1.7	76.3 ± 4.1	191 ± 14	8.1 ± 0.6
Savalou-Zou (58 plants)	111.5 ± 34.3	41.6 ± 1.6	9.8 ± 0.9	31.2 ± 1.3	32.2 ± 2.0	78.8 ± 4.3	183 ± 14	8.6 ± 0.5
Improved population	92.0 ± 32.3	44.4 ± 0.9	9.0 ± 0.6	30.1 ± 0.6	32.9 ± 1.2	83.2 ± 4.1	166 ± 15	8.2 ± 0.4

^{1/} means are followed by standard deviation