SORGHUM BREEDING IN NORTHERN GUINEA SAVANNA (NGS): HAVE WE MADE A DIFFERENCE?



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INTRODUCTION:

Sorghum, locally called Guinea corn has been the most important cereal crop and most important food crop in the savanna areas of Nigeria. It used to account for about 50% of the total cereal production including maize, rice, millet and wheat, and occupied about 46% or 6.0 million hectares of the total land area devoted to cereal production in the country (Obilana, 1983). Yields ranged were between 0.14 tonnes/ha to 0.890 tonnes/ha at the inception of sorghum improvement in the Institute for Agricultural Research in 1956 (Obilana, 1983). In the savanna, there has been tremendous increase in sorghum production both in yields and in total land area under sorghum production.

Collaborative efforts between the Institute for Agricultural Research (IAR) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) towards sorghum improvement started as far back as 1977 when ICRISAT scientists were posted to Nigeria specifically to IAR, Samaru. Although the IAR and ICRISAT Scientists were working independently, they were exchanging germplasm materials and sharing scientific ideas to enhance the development of new sorghum varieties and hybrids.

Between 1977 and 1982, IAR scientists were able to develop and released seventeen (17) varieties of sorghum made of five (5) short season varieties, four (4) medium season varieties, five (5) long season varieties and three (3) very late season varieties of sorghum. Within the same period, three (3) hybrids were also released for farmers production (Obilana, 1983).

In 1981, the International Board for plant Genetic Resources (IBPGR) based in Rome in collaboration with ICRISAT and IAR sponsored an extensive germplasm collection which covered almost the whole of the savanna. The materials collected were shared into three; one set was kept in Nigeria at National centre for Genetic Resources and Biotechnology based in Ibadan, the second set was sent to the Genetic Resources unit of ICRISAT at Patancheru in India and the third set was left for us in Nigeria. Another germplasm collection was sponsored and

organised by the same team in 1983. The materials were again shared as it was in the first case. The use of these germpalsm lines by IAR scientists as well as the ICRISAT scientists based in Bagauda, Kano led to the joint release of four (4) varieties of sorghum and four (4) hybrids in 1996 (Aba *et al*, 2000).

In the area of disease and pests control in sorghum in the savanna ecology, collaborative efforts by scientists in IAR and ICRISAT have succeeded in identifying useful lines of sorghum resistant to some specific diseases. For instance, between 1996 and 1997 , the team working in Samaru and Bagauda identifed three (3) sorghum genotypes – R 6078, IS 1438 and CCGM 1/19-1-1 to be completely resistant to all forms of diseases while Nagawhite was completely resistant to foliar, peduncle and rachis but moderately resistant to panicle anthracrose. Similarly, Foliar anthracrose caused by *Colletrotrichum sublineolium* being a major disease of sorghum in Nigeria was classified using 50 isolates into nine morphological groups (MG) and also classified into seven pathogenic groups (PG). The existence of five races of *C. sublineolium* in the major sorghum growing area of Nigeria has been suggested.

Another interesting investigation on the effort of sowing date on the control of grain mould/headbugs was investigated by the IAR and ICRISAT scientists between 1995 and 1996 at Bagauda. The studies showed that early sowing had lower headbug populations and less

damage than the July sowings. However, it is suggested that the use of sowing date as a measure of control will only be meaningful if farmers integrate it with other measures, including the use of resistant varieties (Marley and Ajayi, 2001).

Have we made any difference?

As early as 1956, when sorghum improvement work started in the Institute for Agricultural Research, yields of sorghum at the farmers level ranged from 0.14 tonned/ha to 0.89 tonnes/ha (Obilana, 1983). In 1984 an estimated sorghum production area was put at six (6) million hectare (Obilana, 1984) with a an estimated production of 3 m tonnes. But by 1986 a conservative estimate of sorghum production was put at about 4 million tonnes annually (Nwasike and Aba,1986). In 1996 (NAERLS/APMEU, 1996) from a field monitoring and evaluation report for that year estimated a production figure of 8 million tonnes. This shows an increase of nearly 4 million tonnes (i.e Double) between 1986 and 1996 a period of ten years. This is because sorghum being a hardy crop, with low fertilizer requirements compared to maize is being planted more by the peasant farmers.

Although there is a general problem in the adoption of new technologies such as the new varieties being released, a study conducted by Atala *et al* 1998, shows that the rate of awareness of the existence of improved sorghum varieties was quite high. However the adoption rate

was low although reasonable high compared to many other agricultural technologies. The major constraints to the adoption of the varieties from the studies were inadequate supply of improved seeds, and scarcity and high cost of fertilizers. This means that we still have a lot to do in ensuring adequate supply of improved seeds to our farmers in order to further boost the production.

A study of the economic impact of sorghum research and extension in Nigeria was carried out between 1980 and 1997 (Atala *et al*, 1997). In their summary, they stated that improved sorghum technology is expected to influence sorghum production through increase in yield on areas where the technology is introduced, and partly through increase in the total area used for the crop leading to increased profitability for the individual farmer. As a result of increasing profitability new areas may be drawn into production of the crop. Similarly, a considerable amount of crop substitution may take place at the farmers level.

However, they showed that total land area under sorghum in the country did not seem to change significantly between 1980 – 1988 and between 1990 – 1997. In like manner, the average national yield was almost at the same level between 1980 – 1988. This notwithstanding the yield capacity of the new varieties of the crop is obvious, with incremental yield ranging from 1.7tonnes/ha in 1980 to 2.7tonnes/ha in 1997.

Have we made any difference? I leave that to you to answer.

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