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VARIETAL YIELD COMPARISON AND ECOLOGICAL ADAPTABILITY STUDIES OF THREE CULTIVARS OF DIOSCOREA ESCULENTA (LOUR.) BURK. (171, 272, AND 372) IN CAMEROON. 1980 - 1982

Comparaison de rendements variétaux et études d'adaptation écologique de trois cultivars de Dioscorea esculenta (Lour.) Burk

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SUMMARY

In Cameroon, there are eight species of edible yams under cultivation, which have been identified and collected for maintenance in a germplasm plot. There are variations in tuber yields and ecological adaptability among varieties.

In 1980 to 1982, three cultivars of *Dioscorea esculenta* (171, 272 and 373) were tested for their tuber yield and ecological adaptability in two different locations. The cultivars were found more adapted to the lowland sandy sedimentary soils than for the medium altitude volcanic soils, though cv 171, on this second location significantly out yielded the others.

RESUME

Au Cameroun il y a huit espèces d'ignames en culture et qui sont identifiées et collectées et maintenues en parcelles de ressources génétiques. Les rendements en tubercule et les adaptations écologiques des variétés diffèrent.

De 1980 à 1982, le rendement en tubercule et d'adaptation écologique de trois cultivars (171, 272, 373) de D. esculenta ont été testés en deux localités. Ils parurent mieux adaptés aux sols sableux sédimentaires de basse altitude qu'aux sols volcaniques de moyenne altitude, encore que dans cette deuxième situation le cv 171 eut un rendement significativement supérieur à ceux des deux autres.

INTRODUCTION

Yams (*Dioscorea* SPP) do not constitute a major staple food crop in any the Cameroonian Communities. However, the yams play a vital role in increasing the quantity of food supply to many people in the Country.

Cameroon is partitioned into five agro-ecological zones. A survey of root and tuber crops production in Cameroon showed that yams are grown in all these zones, (CNRCIP 1980). The demand for yams in Cameroon has been on a steady increase since 1961. This demand led to increase loss of currency by then West Cameroon Government through yam imports from Eastern Nigeria.

The west Cameroon Government then formed a "Yam Scheme" in 1963 to produce seed yams for farmers and to teach them the cultural techniques used in growing them. The setts were bought by the Department of Agriculture from Eastern Nigeria. This scheme spurred most peasant farmers to engage in yam cultivation thereby reducing the loss of currency to Eastern Nigeria (Ndum 1965).

Yam cultivation in Cameroon is mostly handled by peasant farmers whose husbandry cannot cope with the production of the required tonnage by the population. Research work was therefore very necessary to be carried out on yams to provide the farmers with elite materials and a well developed "cropping package" of technology to increase production. In 1969, work was planned for :

i) Collection within Cameroon, importation of yam types and the study of their performances in different agro-ecological zones ; simple classification, multilocational cultivar yield trials and determination of their nutritional composition ; selection of elites for multiplication and distribution to growers.

ii) Studies of various cultural techniques to identify the best for their cultivation.

iii) Studying the effects and economics of fertilizer use.

iv) Studying of the economics of yam production, diseases and pests associated with its production and tuber storage. (LYONGA 1976).

Comportment/ecosystem varietal yield evaluation of yams has been going on in the various yam growing zones of Cameroon. A collection plot of ninety accessions within eight species of edible yams grown in Cameroon has been evaluated and elites adapted to different agro-ecological zones selected (LYONGA 1976). It is the continuous evaluation of yam cultivars at different ecologies that led to this comportment studies of *Dioscorea esculenta* (lesser or chinese yams).

The chinese or lesser yam (*D. esculenta*) has the same tuber sizes like the solanum potato (*Solanum tuberosum*). The natural constraints in yam production, which include very high costs in land preparation, staking, harvesting and the very low multiplication ratio, place *D. esculenta* and *D. trifida* on an *an advantage.*

From the viewpoint of mechanized agriculture, plants producing larger number of individually smaller tubers would be at an advantage and would probably be most promising for study. (COURSEY 1970).

MATERIALS AND METHODS

In 1980, three cultivars of *Dioscorea esculenta* (lesser or chinese yams) were gotten from a germplasm plot at Ekona and evaluated for their tuber yields in two agro-ecological zones. The cultivars 171 from Ibadan, Nigeria, 272 and 372, locally collected, were evaluated for their tuber yields at (Mile 17) 550 meters asl, medium highland altitude and young volcanic soils and also at Yoke, 80 meters asl, lowland and sandy sedimentary soils.

Four ten meter ridges were planted to each variety at 1 x 1m. A randomised complete block design was used with five replications and a plot size of 40 m^2. Planting was done every March and harvested in November. The plants were staked using the trellis system with local materials. The two middle ridges were sampled for data collection. The experiment was repeated for three years and data on the tuber yields were collected and analysed.

RESULTS :

TABLE : Mean Tuber number per $10m^2$ plot and yield (t/ha) of three cultivars of chinese yams (Dioscorea esculenta) tested at two locations in Cameroon from 1980-1982.

Cultivars	Mile 17		Yoke	
	Mean Tuber n°/$10m^2$	Mean yield (t/ha)	Mean Tuber n°/$10m^2$	Mean yield (t/ha)
171	183.2	14.3*	191.5	19.4
272	141.4	8.4	222.0	21.1
372	147.7	6.9	203.3	20.8
Mean	157.43	9.87	205.6	20.43
LSD (P.=0.05)	53.92	3.78	33.82	3.1

* Significant at 5 %

DISCUSSION AND CONCLUSION

The results do not show any significant yield difference in tuber number among the three cultivars in both locations. The mean tuber number ranges from 14.1 - 22.2 per plant in both locations.

Cultivar 171 has significantly outyielded 272 and 372 in tuber weight by 41.3 and 51.8 per cent respectively (P = .05) at Mile 17 medium highland altitude. The three cultivars did not show any statistical tuber weight yield difference at Yoke, lowland sandy sedimentary soils.

On the whole, the three cultivars at Yoke outyield the same treatment at mile 17 by 51. per cent. It would appear that these cultivars are proving more adapted to this ecology than the former. The soils in this lowland sandy sedimentary soils are loose and do not impede tuberisation unlike the heavy and stony volcanic soils of mile 17. This maybe the reflection on the slight increase in tuber number per plant at Yoke in all the cultivars.

Harvesting of tubers was also easier at Yoke with loose soils than at mile 17 with heavy soils. Fungal diseases, which scorched the leaves of the plants, were more pronounced at mile 17 during the crop's lifecycle than at Yoke. This maybe one of the contributing factors to poorer yields at mile 17.

Although the three cultivars proved to be more adapted to the lowland sandy sedimentary soils, profitable tuber yields can be obtained at mile 17 medium altitude volcanic soils if cultivar 171 is used. The Yoke ecology, where these cultivars are more adapted, has poor soils. Judicious use of organic and inorganic fertilizers may more than double the tuber yields. Fertilizer studies will be very necessary for recommendation of the type and best levels for higher yields of *D. esculenta* in this area.

The nature of the plant does not pose any constraints in its production when compared with other yam species. The small vine structures produced by the chinese yams will not require big and tall stakes. The manner in which its tuber are formed does not require large seed beds or digging of holes as other yam species such as *D. rotundata*.

It also a very high mean multiplication ratio of 1:20 and will not constitute a problem in a acquiring planting material. The chinese yam lends itself to mechanisation due to the numerous small tubers it produces which can be mechanically planted and harvested. This yam therefore has a brighter future than most yam species. This yam is very palatable and the manner in which it can be eaten-fried chips, boiled, pounded as "fufu" and porridge - still gives it a better chance for increased production. Since this yam can

do well under hot humid tropics, more research work should be carried out on it on increase its production because it can take the place of Solanum potato and could possibly give rise to the "Yam of the Future".

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