DISCUSSION 3

Dr. Magoon :

In my opinion, Dr. Rogers has done an excellent job in presenting a classification based on good morphological criteria and I am sure this morphological classification will be found useful for its intended purpose — a method by which different morphological types within the complex can be identified, and by which investigators can relate the plants of their collections to those of other areas. However, as you have rightly pointed out, that this is a broad framework, into which other data of a more experimental nature, for example, evidence from other cognate fields such as genetic, cytogenetic and immunochemistry etc., which can result in a more natural classification based on ancestral relationships, will have to be fitted In other words, a combined study of morphological, cytological, genetical and other aspects, with a view to develop a comprehensive classification based on several criteria, is an urgent necessity and studies along these lines have already been initiated in this crop at our Institute as may be seen from the data presented in this regard in my paper. In fact, the potential importance of pachytene analysis and its wide application to several taxonomic, cytogenetic and evolutionary problems has been well realised. I have also described at length in my paper the various advantages of studying the morphology of pachytene chromosomes of the various cassava types and further, the approach adopted by us in classifying the various hybrids, based on the data obtained especially on the nature of chromosome pairing at mid-pachytene stage as well as fertility data, is indeed sensitive enough to detect structural differentiation and incipient evolution in the cassava material under study and it would, therefore, be helpful, if such an approach, coupled with the approach described by you based on morphological criteria, is applied to the vast amount of germ plasm material at present available in the genus before lumping up the different taxa or rearrangement of the various taxa into suitable groups or sub groups etc. This will have to be further supported by genetical data, wherever possible. As you know, from the taxonomic point of view, it is probably of little significance whether 'species' distinctions are attributed to multiple gene substitution or to cryptic or small structural differences, but from an economic stand point it is an issue of prime importance. Upon it depends the degree to which a plant breeder can hope to transfer a character of potential importance from one species to another. If 'species' differences are mainly due to multiple gene substitution, the problem is chiefly a matter of growing large enough progenies to secure the required combination, whereas, the success with which a plant breeder can transfer potentially valuable characters from one species to another, will be inversely proportional to the frequency of small structural differences amongst his breeding material. Such an evaluation is of paramount importance since it would eliminate the loss of energy and time on the part of the breeder in launching a hybridization programme indiscriminately.

Dr. Coursey :

I am extremely interested to hear of this technique, which I understand is being applied so far only to the American forms of cassava. It seems that this technique could be applied with very great value, to study the spread of cassava in the Old World. This has been an extremely interesting ethno-botanical problem involved here. To quote one example, although cassava has been in tropical Africa for three or four hundred years, there are many places, or should I say, some places, where it would perfectly well be cultivated and is now being cultivated in fact, but where it has only arrived in living memory. It seems to me that this technique could be combined with historical investigations, to form an extremely interesting study.

Dr. Rogers :

May I make one comment on that statement? I really did not want to say that my methodology showed any kind of relationship geographically, but clearly it does. I mean it is just to the point where I am not ready to make any specific statement about it. For example, in spite of the fact that Jamaican cultivars have been imported from other parts of the Western Hemisphere, they stick together as relationships, not only with the West Indian cultivars, but also with those along the northern tier of South America, from which they were largely collected. The morphological evidence supports this. The ones that I have collected from Bolivia, for example,

have more in common amongst themselves, and stick together better than those from the Eastern side of Brazil. The Brazilian cultivars seems to hang together, the central America ones have a tendency to hold together. In other words, we have a very powerful tool in our me'hodology, which points to these interesting sorts of relationships. What they mean, and how they are going to be interpreted is yet for us to decide, but they are in line with what you are saying. We only need now to have input data from all over.

Dr. Doku :

We have attempted on a moderate scale to classify our cultivated varieties in Ghana, and we found an interesting character, that is, the height at which the plant branches. The primary branching habit, is either at one third of the plant's height, half way, two thirds or at the apex. Are your varieties consistent in this character ?

Dr. Rogers :

The branching of the plant is clearly co-ordinated with the flowering of the plant. In other words, when it branches it has flowered, so you can say that you have some validity to the character for branching, where you try to make this correlation. However, we discovered that there is a very large number of variations in branching pattern. It is not necessarily advantageous in the process of classification, to divide characters for branching into all of the states which are biologically interesting. At one time we had as many as 16 different states to the character of branching relating it to the time of flowering. When we tested them on the computer a completely smooth curve was obtained.