DISCUSSION 5

Mr. Williams :

I have two questions to put to the speakers. The first is addressed to Dr. Leon and the second to Dr. MacDonald. I need to make a few prefatory remarks to the question I want to put to Dr. Leon. You have made reference in your paper to the wide variation you encounter in the tuber size and colouration within single plants of yuca. Did I understand you correctly ?

Dr. Leon :

I referred to the variation, in particular, in colour in some of these Andean tubers.

Mr. Williams :

Within single plants ?

Dr. Leon :

Yes.

Mr. Williams :

Dr. W. B. Storey from the University of California, Riverside, found that endopolyploidy in roots in a number of species and also chromosome reduction and somatic chromosome reduction, and elimination in some other plant species, such as certain members of the cycodales was associated with root morphogenesis. I would like to say as well, that Dr. Storey and I did some examination on somatic cells, and found the same suggestion in tannias, that in the Xanthosoma species, in **I. trichocarpa, I. gracilis,** and sweet potato, I did some somatic examination and found this suggestion— endopoliploidy might be connected with the differentiation of roots, particularly with respect to the cells which are involved with the storage of starch and so on.

In the Xanthosoma there are very large giant cells, in which can be found raphides, piles and piles of raphides. Do you have any evidence in this crop, the yuca, that this phenomenon might be implicated ?

Dr. Leon :

No. I do not have any evidence but the oxalis is a high polyploid. It is a very complex genus of high polyploids concerned in the yuca and the cultivated oxalis is the highest polyploid in the genus.

Mr. Williams :

Mr. MacDonald, I would like to enquire whether you consider that the absence of seed set in many of your varieties in Uganda could be connected with the possibility that most of your cultivars may belong to the same intra-incompatible group, or in other words, that there may be a few intra-compatible groups in Uganda sweet potato cultivars.

Mr. MacDonald :

We have not looked into this aspect but the seed set amongst the varieties in Uganda is in actual fact quite good. I have no standards of comparison to go on. I can go into a 12 acre field of Bitambi and collect without difficulty something of the order of 5000 seeds, which are open-pollinated. Within the 16 varieties that we have in the museum, we have done some crossing. Admittedly some of the varieties do not cross particularly well — you may get one or two seeds, but the vast majority of them will cross quite easily. Caroline Lee as I remember was giving us 50% set in crosses. This seems quite reasonable to me. In other words of 76 flowers pollinated we could expect to get 36 capsules. Normally we only get one to two seeds per capsule, rarely three.

Mr. Williams :

I was motivated to ask the question, particularly with reference to your local

variety, because there is the possibility that if this is true, there may be a few intra-incompatible inter-compatible groups in your sweet potatoes which could relate to the pattern, the history of introduction of the species, in other parts of the world.

Dr. Rogers :

Dr. Leon, in relation to the species Tropaeolum, the one that grew at about four or five thousand metres, what is the relationship of this species to the lowland species of Tropaeolum in Peru ?

Dr. Leon :

There is no relation. Apparently, this species is not found wild any more. At the lowland elevation they grow lots of Tropaeolum which are used as vegetables. The leaves are harvested, and are sold in the market, but not in this particular species that grow at the higher elevations.

Dr. Rogers :

Are there evidences, ethnological or archaeological, about the age of this Tropaeolum at the high elevations ?

Dr. Leon :

There is no evidence from the ethnological or archaeological point of view.

Dr. Bolhuis :

Are these short day or long day plants ?

Dr. Leon :

Most of the plants are short day plants, but we have some which are practically indifferent to length of day.

Dr. Jones :

Dr. Leon, what is the potential economic range for these highland tubers around the world ? How far will they grow in the temperate zone, and where might they grow in the tropics ?

Dr. Leon :

They have been tried in several places. For instance, once in a while you find Ocas in the Paris market in France, and they have been grown in southern France for a while, and they were tried in England. And the famous, Vilmorin wrote several papers in the introduction of yucas. As Dr. Bolhuis mentioned, most of them are short day plants, so they will not grow very well because they need plenty of sunlight and short days, so it is very difficult to grow them in temperate zones.

Arracachas on the other hand have been grown in many places outside the Americas, and also in the temperate zone, for instance, in Sao Paulo in Brazil where Arracacha is a commercial crop for the preparation of soups and so on in canned and dried material. I would like to mention also, that there is one other tuber in the Andes — they call it Jacon — of the Compositae similar to Jerusalem artichoke, and this has been tried also in Europe as a source of inulin because the tuber has inulin-like properties and has been tried commercially without much success. But it has been grown for years for that purpose in southern France and Italy.

Dr. Maner :

Dr. Leon, you made some comments concerning the nutritive value of some of the root crops that you have studied. You stated that some of them were very high in protein and had very good amino acid content. Are these data available, if so, where ?

Dr. Leon :

This is a little confusing, this data of mine. These root crops are poor in food value, in general, but once they are frozen and dried, then the protein content climbs to 6%. What I mentioned is that guinoa (a cereal used as a complementary food with highland Andean tubers) is an excellent source of protein and Dr. Bolhuis has done some work on this in Holland. He has published a paper on the subject.