DISCUSSIONS

Professor Harland :

In studies of the yield of crop plants it is desirable to try to specify the factors which are limiting, that is, what factors impose a cieling on yield.

Mr. Gooding :

Yes, I could not agree more though it is somewhat difficult to establish these factors, when you are doing field experiments on plantations in which you have very little control over any of the factors except possibly fertilizing. We have no control over sunshine or water, and the best we can do under those conditions is to keep the fullest records possible, and when you study this, year by year, locality by locality, you begin to get the idea that a certain factor becomes limiting at a particular level. We certainly bear this in mind. It is one of the tenets of my belief, so to speak, that limiting factors are sometimes a good deal more important than interactions that you look for.

We have had a case in point with corn, in which in one year we had quite a wide distribution of rainfall. We attempted to do fertilizer experiments and we had a rather interesting phenomenon that in regions of lower rainfall, there was absolutely no response to fertilizer, while in regions of higher rainfall we got a very substantial response. The conclusion being presumably, that rainfall was a limiting factor and when rainfall was a limiting factor the plant just could not grow enough to make use of fertilizer we put on it.

We had a rather similar experience last year, in which we had exceptionally high rainfall, and in the highest rainfall areas we got no response to treatments. In that case, excess water becomes a limiting factor. I think that's the sort of thing you have in mind Professor Harland, and you are really advising us all to keep these things in mind.

Dr. Martin :

Could you summarize recommended cultural practices with **D. alata**?

Mr. Gooding :

I will stick my neck out, but please regard these as very, very tentative and suitable only to the conditions under which I am experienced. If you are in sugar cane land and working as a catch crop, plant on ridges 5' by 2' 6" apart. Plant at the end of May, which is about the time the yam normally breaks dormancy and is also a week or two before the onset of the rainy season, fertilize with two to three hundredweight of sulphate of ammonia, plus 1½ cwt of sulphate of ammonia, plus 1½ cwt of muriate of potash at the appearance of second spires. Keep free from weeds and harvest when mature. Spray with Cupravit or some copper fungicide.* If you see any attack of any plants appearing to die back for no apparent reason, it's probably **Colletotrichum**. Very rarely you may find an attack of **Laphygma** or something like that, which you will have to spray with Sevin, but this is extremely rare in yams in our conditions. If we were planting as a crop in its own right, I would recommend planting on ridge 2' 9" apart and the plants 3' apart in the ridge. We have a good deal of information about the effect of competition between plants.

Dr. Martin :

How do you harvest your yams?

Mr. Gooding :

I regret so say, a man with a fork lifting them out. I have been looking at the U.W.I. mechanical harvester to harvest sweet potato with great interest. I hope that if we grow small enough or round enough yams — the Coconut Lisbon as distinct from the White Lisbon — we may be able to use mechanical harvesting, breaking the ridge at least and throwing them out in the same way as you saw being done for potatoes

*Editor's Note. **Colletotrichum** appears to be insensitive to copper Fungicides. The organic fungicides are recommended under Trinidad conditions.

yesterday. But at present, they are harvested by hand, and we reckon that harvesting, rough cleaning, and transport and stocking in a shed in the plantation cost about one cent a pound.

Dr. Martin :

How do you control weeds waiting for yams to sprout?

Mr. Gooding :

We are trying pre-emergent herbicides such as Dacthal or Prometryne, but the normal commercial method is a woman with a hoe, who has so many acres to keep weed free. She is paid somewhere between $1.50 and $1.70 per acre per week and this is a time honoured method. Cost studies have indicated that with the current rates, it is almost exactly the same cost as spraying with Prometryne or Dacthal over a period of about 6 months.

Dr. Martin :

Have you had any experience of holding seed yams under various germination promoting conditions to shorten the time in the field before sprouting.

Mr. Gooding :

No, I have not.

Dr. Iton :

Virus- like symptoms have been reported on yam foliage in Barbados. Could Mr Gooding say how widespread this condition is and whether it has any connection with deterioration in yield?

Mr. Gooding :

I personally have not yet seen this symptom, though I heard that it was reported in one plantation in St. Philip. I think Mr. Jeffers or Mr. Pilgrim could be asked to comment on this because I think they know more about it than I do.

Mr. Jeffers :

We have seen some symptoms appearing to look as if it could be a virus infection on the foliage of yams. At one stage, we thought that this could have been possibly associated with the internal spotting, but to date we have not been able to correlate anything. With regard to the internal spotting, this was noticed somewhere around 1965 when the yams were exported to the United Kingdom, but recently in carrying out a survey in Barbados, one planter reported that he noticed this condition about 30 years ago. We, so far, have had trends which seem to indicate that proper attention is paid to the selection of planting materials, that if you plant clean tubers that you are likely to harvest a clean product. More recently we have sent materials to the Tropical Products Institute in the United Kingdom, and they seem to think that our problem might be a virus one. We are not yet certain of this, but we are carrying out further investigations.

Mr. Pilgrim :

I just want to add one point to what Mr. Jeffers has just said. We are not at all certain about this problem of the internal spotting, whether it could or could not be a virus. One of the things is that we have noticed no symptoms on leaves, and therefore we are rather sceptical at the moment.

On the matter of spacing and yields, Mr. Gooding said that he had carried out very few experiments on this matter but we in the Ministry of Agriculture, have also carried out experiments on spacing as related to yields, and our results are almost identical with his 5' x 5' spacing against 5' x 2'. The 5' x 2' gives almost double the yield.

Mr. James :

I was rather interested in your attempts to grow yams out-of-season as you might say. You said that the vines died off after 4 months which was around mid-December and this seemed to be around the same time that the normal crop would have matured. Elsewhere in that paragraph you hypothesised that the maturing of yams or the die back of yams might be associated with the trade winds which also came around mid-December. But you observed that this also coincided with the end of the rainy season and I was considering in Trinidad the die back of the normal crop of yams also seems to occur with the end of the rainy season, usually towards the end of January. I was wondering if there might be some association between the ending of the rainy season with the dying back of yam vines.

Mr. Gooding :

Yes indeed. I put forward all these points simply because we do not know and they do require further study. I'm glad to see that somebody has actually read the paper because these are points I did not make in my presentation but were actually in the paper. We did try, you see, yams in which sprouting had been delayed by the use of maleic hydrazide and they were planted about 4 months later than the normal yams. At that time they were beginning to sprout and we had hoped that we might carry them on and reap some later, but as I pointed out in my paper they died back at the same time as the yams planted 4 months earlier, giving less than one pound per plant. It could have been the onset of the dry season; it could have been the development of leaf disease, it could have been the drying effect of the trade winds which appear at about the same time as the rainy season ends.