COCOA QUARANTINE PROJECT

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Introduction

Our third newsletter comes after a year in which we have spent considerable time reconsidering our quarantine procedures. Whereas screening for fungal pathogens is straightforward and reliable, the principal area where there is considerable scope for improvement is in virus detection methods. At present the only virus groups known to infect cocoa are found in West Africa of these the main group is cocoa swollen short virus (CSSV). A second cocoa leaf necrosis virus is also known in West Africa but other than this, reports of virus-like symptoms in cocoa are confined to a report many years ago of a virus infecting cocoa in an area in Trinidad which has since been developed for housing. Unusually, no virus-like symptoms have been reported in the centre of origin of cocoa in South America or in other areas in Central America where cocoa is now grown. Other reports of virus symptoms in cocoa, such as in Sri Lanka and Malaysia, are presumably due to importing infected cocoa material directly from West Africa to that country.

Presently, the only detection method for cocoa viruses are based on visual detection on susceptible cultivars after transmission from a graft union with infected material (Thresh, 1961; Frison and Feliu, 1989). Both publications report that virus symptoms appear within 3 flushes so that typical quarantine based on the above procedure would take approximately 6 months. To be certain, we have maintained a quarantine period of 18 months, but even so, this year virus symptoms appeared in a clone of West African origin after more than 20 months in quarantine and so we have now increased our quarantine period to two years. Clearly, this adds considerably to the length of time that we must hold material before it is distributed. However, on the horizon there are the prospects of other detection methods which offer both more reliable and more rapid screening and detection of cocoa virus in cocoa germplasm. Research currently being carried out at the Cocoa Research Institute of Ghana (CRIG), ENIAP in France, Braunschweig, Germany and the John Innes Institute in the U.K. is aimed at developing cellular detection systems for CSSV. Seriological techniques are currently available for a number of cocoa swollen shoot virus strains as a result of a collaborative link between CRIG and Germany. However, currently these tests are only sensitive enough to detect virus in leaves which show visual symptoms of virus attack. Nevertheless, this test has proved very useful to us at Reading as a means of confirming whether suspected visual symptoms are caused by CSSV.

More recently, genetic engineering techniques have shown promise in the development of molecular probes for detecting virus types and work in the U.K., Germany and France indicates that these techniques show great promise in developing a sensitive CSSV probe for cocoa.

Such a probe should allow us to routinely screen new material entering the facilities for the presence of CSSV type virus. The probe will allow rapid detection and so should increase the rate at which clonal material can be made available to breeding programmes. However, the development of such a probe depends on the appropriate funding to enable these centres to undertake the necessary research. This could well be a major stumbling block but initial discussions are taking place between U.K., Germany, France and Ghana to seek funding for a collaborative research project on this subject.

Future Developments to the Reading Facilities

We have agreed plans for a further modest extension to our facilities to be carried during the Spring and Summer of this year. One end of our twin spanned tunnel will be extended to give an increase in floor area of approximately 20%. This will be accompanied by the construction of an insect-proof partition which will separate the current two compartments into four. This should allow better separation of batches of clonal material as they pass through quarantine.

CRU, Trinidad-Reading Video

During the last year a video has been made by the Biscuit, Cake, Chocolate and Confectionery Alliance to illustrate the work of the Cocoa Research Unit, Trinidad, in managing the International Cocoa Genebank, Trinidad and that of the University of Reading in providing quarantine facilities for cocoa germplasm. Anyone wishing to obtain a copy of this video should contact Mr. E. T. Beauchamp, B.C.C.C.A., 11 Green Street, London, W1Y 3RF.

International Cocoa Germplasm Database

For the last year we have been undertaking the development of an International Cocoa Germplasm Database (ICGD). This has developed from the computerised Catalogue of Primitive Cocoa Collections (version 1) which was sent out to cocoa research stations in October 1989. The ICGD is designed to provide information not only on cocoa clones which result from collections made from the wild but also selected (improved) cocoa clones. This information includes data on where collections were made, present location and availability of clones held in germplasm collections, morphological descriptors including pod and bean values, and disease resistance characteristics. The information can be accessed through a menu-driven program which can provide a variety of reports and summaries.

The Database is designed to run on any IMB PC compatible computer with a hard disk and can be used without any additional computer software. The ICGD (version 2) will be distributed in late February/early March and anyone wishing to obtain a copy should write directly to Dr. Michelle End, Department of Horticulture, Plant Science Laboratories, University of Reading, Whiteknights, PO Box 221, Reading, RG6 2AS. Michelle will need full details of the machine you intend to run the ICGD on, such as the type of floppy disk drive and hard disk space available. If you do not have access to a suitable computer but would still like information on cocoa germplasm, we are hoping to distribute information from the database in printed book form this summer. If you would be interested in such a book, or you have any queries concerning cocoa germplasm, please contact Michelle at the address above.

Germplasm Availability 1991

Although we had to stop sending cocoa germplasm for a six month period in 1990 whilst we reassessed our quarantine procedures, we resumed our germplasm exports in the Autumn and we are keen to hear from members wishing to receive germplasm. As stated in previous newsletters, although we can air freight material to you, if material can be transported via personal couriers the chances of successful transport are greatly increased. We have included a list of clones currently housed in the quarantine facilities, at the end of this newsletter.

With best wishes,

Paul Hadley
Teresa Lee

References

Frison, E.A. and Felin, E. (eds.) 1989. *FAO/IBPGR Technical Guidelines for the Safe Movement of Cocoa Germplasm.* Food and Agriculture Organisation of the United Nations, Rome/International Board for Plant Genetic Resources, Rome.

Thresh, J.M. (1960) Quarantine arrangements for intercepting cocoa material infected with West African viruses. *FAO, Plant Prot. Bul.* 8, 89-92.

List of Clones in Quarantine at Reading
January 1991

AMAZ 3 -2
AMAZ 5 -2
AMAZ 10 -1
AMAZ 15 -15
BE 3
CC 38
EQX 0
EQX 3161
EQX 3360 -3
ICS 16
ICS 100
IMC 14
IMC 61
IMC 96
LCT EEN 37 A
LCT EEN 37 I
LCT EEN 162 1010
LCT EEN 241 ON 163 B
MO 81
NA 33
P 4 B
P 14 B
P 19 A
PA 20
PA 70
PA 137
PUCALA 1
R.B. 39
SC 4
SCA 19
SIC 5
TJ 1
UF 667

AMAZ 6
AMAZ 10 -3
AMAZ 15
BE 10
COCA 3370 -5
EQX 69
EQX 3348 -52
EQX J 5
ICS 27
IMC 9
IMC 20
IMC 78
LAF 1
LCT EEN 37 G
LCT EEN 46
LCT EEN 163 D
MAN 15 -60
MOCORONGO
NAPO 2
P 7 B
P 16 A
PA 7
PA 51
PA 88
PA 175
R.B. 29
SC 1
SC 9
SIAL 93
SPEC 54 -1
UF 11
UF 676

AMAZ 6 -3
AMAZ 12 -4
BE 2
CC 11
EET 272
EQX 78
EQX 3348 -44
EQX Z
ICS 43
IMC 11
IMC 54
IMC 83
LCT EEN 28 S1
LCT EEN 37 F
LCT EEN 127
LCT EEN 163 A
MAN 15 -2
MXC 67
P 4 A
P 10 (10P)
P 19 B
PA 18
PA 56
PA 107
PA 300
R.B. 33 /3
SC 3
SC 10
SIAL 339
SPEC 160 -9
UF 221
Y 44