THE LONDON COCOA TRADE AMAZON PROJECT

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INTRODUCTION

In May 1979 at a meeting of the Inter-American Cocoa Disease Foundation (CIEC) in Quito it was decided to start a programme of collecting wild cocoa in Ecuador. This collecting programme became known as the London Cocoa Trade Amazon Project, because it was funded by the London Cocoa Market. Local facilities were provided by a research organisation in Ecuador (Instituto Nacional de Investigaciones Agropecuaris or INIAP). The project began in January 1980.

WHY COLLECT WILD COCOA?

Cocoa comes from forests in South America. Most cocoa crops around the world, including those in Papua New Guinea are descended from just a few wild trees collected many years ago.

Over the years, growers have tried to improve their crops by selecting good plants, and by growing hybrids, but not enough progress has been made. This is because the genes for high yield and disease resistance are just not found in cultivated cocoa. A 'gene' is part of a plant or animal cell which passes on a particular characteristic from one generation to the next. There is not a wide enough variety of genes in cultivated cocoa because all the plants are descended from only a few wild cocoa trees.

Some wild cocoa was collected from the Upper Amazon area 40-50 years ago. These plants, were crossed with cultivated cocoa varieties. The crosses produced hybrids with greater yields and better resistance to disease than the common cultivated cocoa plants.

If more wild cocoa were available for plant breeding, then more genes would be available. Even bigger improvements in yield, resistance to pests and diseases, and vigour might be possible. This is the main reason for collecting wild cocoa varieties.

A lot of cocoa grows wild in the rainforest of the Upper Amazon in South America. Two international organisations, the Cocoa Producers Alliance (CPA) and the International Board for Plant Genetic Resources (IBPGR), recommended that new collecting programmes should be started as soon as possible. The rainforests of the Amazon basin are disappearing quickly because of development in the area. Many people

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are moving there to farm and ranch cattle. Roads and airstrips have been built, towns have been founded. As the rainforest is cleared, the wild cocoa plants are destroyed.

As a result, the London Cocoa Trade Amazon Project was started. A plant collector was appointed to travel around the Upper Amazon rainforest collecting material for breeding from as many wild cocoa plants as possible.

Collecting programmes for cocoa are also going on in other parts of South America.

COLLECTING COCOA

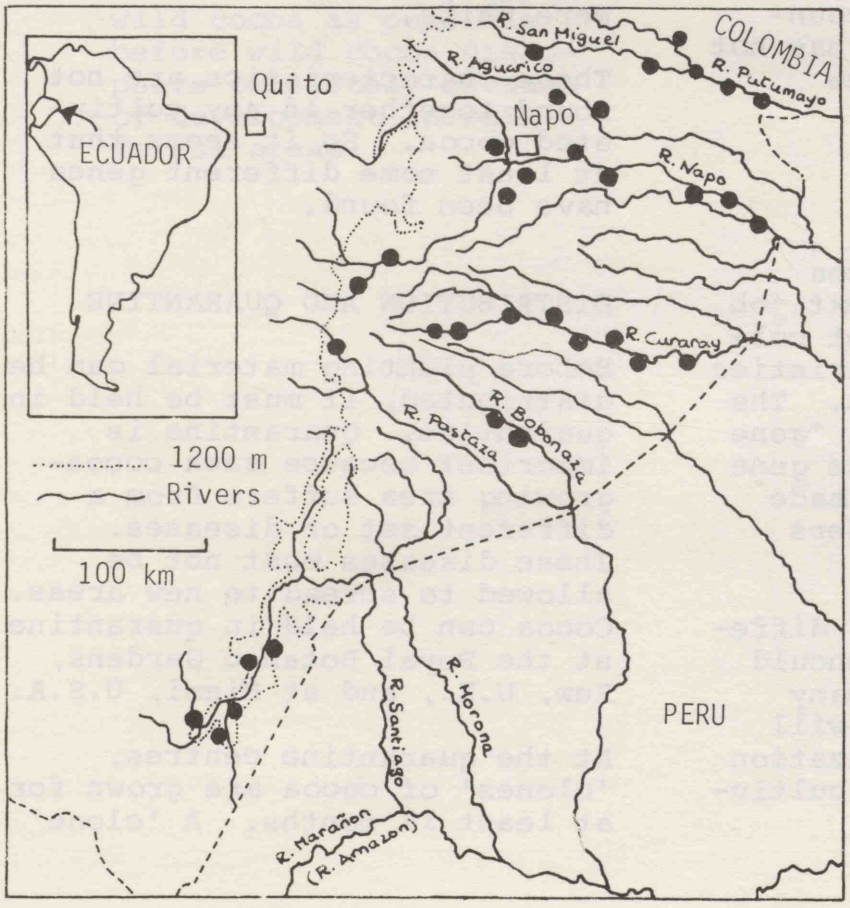
The London Cocoa Trade Amazon Project is based at Napo Research Station in Ecuador. There are still fairly large areas of untouched rainforest close by.

The plant collectors travelled by light aircraft, car, canoe and foot to places up to 500 km apart. They covered as much of the area as possible, collecting from places where people live and farm, as well as from the forest.

Many wild cocoa trees were found. Unfortunately, very few had pods. If the trees had pods, collection was easy. The unopened pods keep for at least 3 weeks. Usually, all the seeds will grow.

For trees with no pods, budwood had to be taken - that is, short lengths of young branches with dormant buds. Budwood will live for about 10 days if the ends are waxed to reduce water loss, and it is packed carefully in damp newspaper.

At the research station, a nursery was set up for the material collected. The seeds were



The Amazon region of Ecuador, to show the postion of the Napo Experimental Station. The sites where cocoa has been collected are marked with a dot. Each dot represents one or usually more than one collection.

planted and the dormant buds from the budwood grafted onto rootstocks (see HARVEST, Volume 8, No.4, pp. 156-160, for a description of budding in citrus). The budding operations were often unsuccessful. In spite of this, by the end of 1980, of the 160 collections made, nearly 130 were safely growing in the nursery.

By June 1982, seeds or budwood had been collected from 325 wild trees, and 250 were growing successfully.

The collectors did not try to select only healthy or disease-free trees. This is because even very poor looking trees may have some valuable characteristic which is hidden - such as resistance to a particular disease. One special reason for collecting wild cocoa in the Upper Amazon was the hope of finding trees with resistance to witches' broom disease. This disease is caused by a fungus. It has ruined cocoa plantations in several countries. Fortunately, it has not yet appeared in Papua New Guinea.

THE 'GENE-BANK'

After collecting the cocoa planting material the next job was to set up a permanent collection of these wild varieties at Napo Research Station. The collection is known as a 'gene bank'. Material from the gene bank will eventually be made available to cocoa breeders throughout the world.

This large collection of different wild cocoa plants should bring into cultivation many different genes. These will be the basis for hybridization with the present common cultivated cocoa varieties.

The collectors aimed to grow 10 plants from each plant collected. These are grown in a single row with 3 m spacing, and 4 m between rows. Blocks of 10 rows are separated by a 10 m space. All trees are labelled and each row has a per-permanent post carrying the collection number. As far as possible, natural forest shade is used.

CHARACTERISTICS OF WILD COCOA

Data about the wild trees was recorded. The wild trees in this area grow to about 20 m. On plantations, cocoa trees usually grow to about 10 metres. The wild trees develop as clusters of about 12 leaning trunks. If a trunk falls over, it often takes root a few metres away from the base of the original trees. The pods were all found to be fairly wrinkled or very wrinkled; green, ripening to yellow. Pod walls were thick, soft and easy to cut. Seeds were white.

These characteristics are not found together in any cultivated cocoa. So it seems that at least some different genes have been found.

DISTRIBUTION AND QUARANTINE

Before planting material can be distributed, it must be held in quarantine. Quarantine is important because each cocoa-growing area suffers from a different set of diseases. These diseases must not be allowed to spread to new areas. Cocoa can be held in quarantine at the Royal Botanic Gardens, Kew, U.K., and at Miami, U.S.A.

At the quarantine centres, 'clones' of cocoa are grown for at least 18 months. A 'clone'

is a group of plants which is grown vegetatively from the same parent plant. During the 18 months the plants are inspected regularly for disease and insects. Material is not distributed unless it is disease and insect-free for the whole time.

The new varieties of cocoa held at Kew and Miami are available for distribution to all cocoa breeders. The special characteristics of most clones have been recorded, so plant breeders can request clones which would suit local needs - for example, cocoa which grows well without shade; or is easily propagated from cuttings.

CONCLUSION

Cocoa collecting programmes, such as the London Cocoa Trade Amazon Project, have the following aims:

1. To collect as many types of wild cocoa as possible before wild cocoa disappears completely because of development in rainforest areas.

2. To raise clones of each new variety and make breeding material available to cocoa breeders throughout the world. The new breeding material will widen the genetic base of cocoa. That is, there will be a much bigger variety of characteristics or genes which parent plants can pass on to their progeny.

3. Plant breeders in cocoa-growing countries will carry out their own experiments using the new material. It will take many years before all the useful characteristics are recognised. However, with a bigger number of varieties to work with, the chances of finding high producing, disease resistant strains are much greater.

Such programmes therefore will have a very important effect on the cocoa industry in Papua New Guinea in the future.