

A Wealth for the Future - A Forest Tree Bank

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Introduction

A search for underutilized plants and their exploitation as new sources of food would contribute in part to self sufficiency in food, which is of prime importance in the alleviation of poverty.

There are over 800 species of edible fruit-bearing forest trees all over the tropical world, but only about 70 of these are found in Sri Lanka. When extended to other fields of economic interest such as timber, non-edible products, medicine and horticulture, the list could cover well over 6000 species.

Sri Lanka offers an ideal location for the duplication of tropical forest tree germplasm in an ex-situ bank, as most tropical habitats of the world have their counterpart somewhere in the island. An ex-situ germplasm bank is a collection of as many species and their genetic variants as possible, explanted from their indigenous sites and replanted together elsewhere. This would be an accessible pool of genetic variants from which generations of scientists could breed new varieties in the future.

General Objectives

To create an ex-situ germplasm bank of the tropical forest trees of the world in Sri Lanka.

Action Plan:

Material to be collected:

All species of tropical trees and their genetic variants. A computer database of the world's tropical trees is being compiled by extracting the relevant information, species by species, from a bibliography of about 200 published works on various flora, atlases, forestry manuals, taxonomic handbooks, materia medica, timber inventories etc.

Collecting sites:

All accessible tropical countries. The database will furnish the list of species available in a given country, their distribution along the most practicable routes, their optimal seeding seasons etc.

Planting sites:

Germplasm will be planted in Sri Lanka in biotopes corresponding to the natural habitat from where each species was collected. Out of six types of biotopes which are being planned in the long term (Fig. 1), Dambulla - Kandalama (Fig. 2) represents one. The Popham arboretum which is the generous gift of Mr. Sam Popham is found in this region.

Collecting Method:

Field explanting *in vitro* will be used. This is a method whereby tissue cultures will be explanted at the collecting site itself. IFS researchers have devised a method whereby an explant (apical or axillary bud, meristem, leaf tissue, anther, embryo etc.) is placed in a special flask containing the medium of growth, in the field, under aseptic conditions. The cultures will then be transported to distant gene banks. This offers a practical solution to the problem of transport space and cost, quarantine guarantee and low seed viability encountered with tree germplasm.

Biotechnological infrastructure:

The explanted material will be maintained in the Biotechnology Laboratories and greenhouses of the IFS before being transplanted, hardened and taken to planting sites.

Logistics - Overseas collection:

The logistics of the whole project involve two main activities

- a) Collection of germplasm overseas
- b) Planting collected material in Sri Lanka

Overseas collection consists of three types of operations:

Reconnaissance trip:

A researcher previously acquainted with the region will visit the site. He will attend to administration details, make travel contacts, negotiate the co-operative services of a local taxonomist and determine a period to suit collecting the largest possible number of species.

This trip is indispensable for estimating the actual cost and the length of stay required for a subsequent expedition when the real collection will be made.

Feasibility trip:

Two or three researchers could go on such a trip when about a hundred different species may be brought back by hand. This should suffice for small countries or regions with only a limited number of species to be collected.

Full-Scale expedition:

More than four researchers would be required on an expedition to regions with a high density of tropical germplasm.

Regions of South East Asia and East Africa, phenomenally rich in tropical forest trees, are directly accessible by sea routes from Sri Lanka. An expedition to them by cargo boat will be relatively cheap and could furthermore be equipped with a minibus transformed into a mobile laboratory.

Logistics - Agro forestry:

The general policy of planting is rather one of interplanting, in that no clearing of pre-existent trees will be involved. The new entrant is left to fend for itself and find its place in what is presumably the closest to its natural ecological niche.

Of course, plants will have to be protected initially, properly tagged and their exact location estimated to a few meters. Measurement of angles between directions of signals coming from transmitters placed at known points, detected by a radar device under study at present, will be used in locating positions of plants.

Benefits:

The new introductions will constitute a means of active reforestation, and the various zones of the Bank will turn out to be new forest reserves.

A duplicate repository of a species will be available even if the species were to be lost from its original habitat through some natural disaster or other cause of extinction.

The most outstanding feature of a tropical forest, its remarkable genetic diversity is not only maintained but enhanced.

The principal benefit accruing from the Bank will be its use for the future improvement of both economically valuable species as well as hitherto underutilized ones.

The various zones of the IFS Bank, former forests of the community, will belong to the community and sustain a livelihood for the villagers; who will consider it as their own property. Much will depend on imparting such a consciousness to their minds.

THE FOREST IS A PECULIAR ORGANISM OF UNLIMITED KINDNESS AND BENEVOLENCE THAT MAKES NO DEMAND FOR ITS SUSTENANCE AND EXTENDS GENEROUSLY THE PRODUCTS OF ITS LIFE ACTIVITY. IT AFFORDS PROTECTION TO ALL BEINGS. OFFERING SHADE EVEN TO THE AXEMAN WHO DESTROYS IT.

GAUTAMA BUDDHA

EVER SINCE THE BEGINNINGS OF AGRICULTURE TEN THOUSAND YEARS AGO, MAN HAS USED MORE THAN A HUNDRED THOUSAND EDIBLE PLANT SPECIES. BUT IN OUR TIME, HARDLY ONE HUNDRED AND SIXTY ARE CULTIVATED. INDEED, THE GREAT MAJORITY OF MANKIND LIVES ONLY ON TWELVE SPECIES.

JOSE ESQUINAS-ALCAZAR, F.A.O.

MORE THAN 40,000 PLANT SPECIES WOULD HAVE DISAPPEARED FOR EVER BETWEEN NOW AND THE MIDDLE OF THE 21ST CENTURY, A LOSS CLEARLY GREATER THAN THAT ESTIMATED FOR THE LAST GREAT BIOLOGICAL EXTINCTION AT THE END OF THE CRETACEOUS PERIOD, 65 MILLION YEARS AGO.

P.H. RAVEN, MISSOURI BOTANICAL GARDEN, U.S.A.

Copies of Computer database sheets of tropical tree.

n°: 465

PARKIA BIGLOBOSA

SYNONYMS: MIMOSA BIGLOBOSA

FAMILY: Mimosae

COMMON NAMES:

DISTRIBUTION: Sahelian zones. Cultd in tropical America & West Indies

DIVERSITY CENTRE:

ECOLOGY:

HABIT: Big tree, 15 - 20 m.

BOLE: 17 cm dbh.

HABITAT: Dominant in dry Sahelian forests

ALTITUDE:

RAINFALL: 500 - 700 mm.

TEMPERATURE:

LIGHT:

PROPAGATION:

SEED: 5000 / kg. Boil 7 mns before sowing in polybags, transplant after 10 - 14 wks.

VEGETATIVE: Suckers.

IN-VITRO:

REPRODUCTIVE PERIOD: Flg & frtg in dry season.

USES:

EDIBLE: Yes. Fresh aril. Fermentable juice. Seeds, rich in protein, give a strong vegetable cheese ('Soumbara').

VEGETABLE: Yes. Cheese added to sauces. Grains substitute for coffee.

MEDICINE: Yes. Lf blades for burns & haemorrhoids. Bark for diarrhoea, sterility, bronchitis, leprosy, venereal diseases, caries, dermatitis, Guinea worm, filaria, ricketts. Pod gives a fish POISON.

NON-EDIBLE: Yes. Blue dye from pods. Cork has tannin. Ash for soap or snuff.

TIMBER: Yes. Distinct heartwood, moderately hard, easy to saw, stick & polish, but insect-susceptible.

HORTICULTURE: Yes. Decorative shade tree. Good mulch.

COLLECTION:

DATE:

LOCATION:

PLANTED:

DESCRIPTION: Big, parasol crown. Scaly bark. Rusty slash. Lvs biparipinnate, dark green, 14-30 prs of pinnae with 50-70 prs of lflts, 1-1.5 x 0.3 cm. Young trees & coppices have bigger lvs. Rachis pale brown & downy. Red/orange fir balls, 5 cm, on peduncles of 30 cm. Pods 45 x 2 cm, arched, suspended in bunches, each on receptacles. Dehiscent on trees, several black seeds coated with a yellow pulp rich in saccharose.

NOTES: In its botany & its uses it resembles *P. clapertoniana* found in the wet savannahs of Ghana & Mali. Spacing 5 x 5 m. Thinning after 8 - 10 yrs to 100/h. Adulthood in 30 - 40 yrs. Frtg after 8th yr. 25 - 100 kg frt/tree. Cheese commercialized in Burkina-Faso & Mali.

REFERENCE: von Maydell. Aubréville-Soudano-Guinéene. Berhaut. Biffard. Irvine. Kerharo & Adam.