

INTRODUCTION

In an attempt to check diseases of plants, knowledge is required of the cause of disease, life history of the parasite and of the circumstances which control the establishment of parasitic relations between it and the host.

Many remarkable advances have been made in the field of plant pathology but relatively few concerned with an understanding of maladies caused by phanerogams.

It is with the Trinidad members of a family of dicotyledons, the Loranthaceae (or mistletoes) that this investigation is concerned.

It is convenient to deal on paper with three distinct phases of plant disease control:-

1. attack on the parasite,
2. strengthening of the resistance to parasite attack of the host,
3. modification of the environment.

In practice however, all must be taken together and it is therefore only possible to pursue intelligent control measures with a knowledge of the above named considerations, plus an appreciation of the circumstances which increase and decrease the power to injure and of the nature of susceptibility to attack of the crops.

In Trinidad this type of information is not generally available, in fact little else has been done in this field other than collecting of the species occurring here. In this context it should be noted that these dicotyledonous woody plants are scheduled "injurious" by the Department of Agriculture of Trinidad and Tobago, though few people take notice of this or appreciate the amount of damage caused by the pest.

That relatively little is known by agriculturalists throughout the world about members of the Loranthaceae does not mean that people have

ignored its presence; on the contrary, they have attracted a great deal of attention because of their peculiar growth habit for many hundreds of years.

The mistletoes as members of the family are called are spread fairly widely throughout the world 39 genera containing approximately 1300 named species in both temperate and tropical zones. Most of them are semi parasitic woody dicotyledons though autophytic species do occur e.g. Giadendron.

In form, the mistletoes vary from small inconspicuous plants with reduced flowers to large crowns of showy well developed dicotyledons with hermaphrodite flowers.

Many mistletoes are surrounded by mystic folklore, some having found their way into healing arts and religious rites and superstitions throughout the world.

The common European mistletoe Viscum album left the realms of witchcraft and became accepted by Sir John Colbatch in 1719 as "a wonderful cure for convulsive distempers" (Gill and Hawksworth, 1961).

Later it went out of "pharmaceutical favour" except as a cure for dermatitis.

Gaultier (1906) discovered that extracts from mistletoe of a particular genera had definite depression action which was later found to be due to histamine, isolated as late as 1957 by Sajner and Veris.

Between the years 1949 - 1958 hope was held of extending therapeutic properties to the treatment of inoperable cancer (Bruck, 1950:1954, in Gill and Hawksworth, 1961).

Mistletoes other than Viscum album are of relatively little medical importance though many were and still are used fairly extensively in tribal medicine, especially in the assistance of childbirth.

Of more interest to agriculturalists is the fact that many peoples have used the "berries" of the Loranthaceae as food and recognised them as being of some importance as fodder supplies in times of difficulty particularly.

In Europe V. album is valuable game forage (Tubœuf 1923, 1908 in Gill and Hawksworth, 1961) and has proved nutritious food for livestock (Cerecelet 1948; Giniensis and Ray, 1905; Letacq 1923; in Gill and Hawksworth 1961).

In the United States of America species of Phoradendron have been fed to hogs and cattle (Muensher 1951; in Gill and Hawksworth 1961). Texas cattlemen value Phoradendron flavescens or mesquite as winter and drought cattle feed, while cattlemen of the Shastri valley feed it to cattle too. Loranthus spp. were used in Australia and New Zealand as food for sheep, cattle and camels (Hartigan 1958a; May 1941; Descott 1946; in Gill and Hawksworth 1961).

Latex from mistletoe berries has been used as a commercial source of rubber in Venezuela (Warburg 1905 in Gill and Hawksworth 1961), while Vol. II Phytopathology (1921) contains a short paper on the extracts of mistletoe berries for use in herbarium work.

People then are aware of the presence of mistletoe so that one may wonder why it should be that so little is known about it by agriculturalists in Trinidad. Literature is fairly plentiful but tends to be very scattered in time and space and any collection of it immediately indicates the complexities involved in a study of this family.

Fairly obviously different genera or even species attacking a range of hosts under varying conditions will behave quite differently.

Most of the research on the family has been done on those important species occurring in the temperate regions of the world e.g. Viscum album in Europe; Phoradendron spp. in North America along with work on Giadendron and Arceuthobium, somewhat specialised genera.

Here in Trinidad much basic research is required:- which genera occur widely here and which spp are important as crop pests? How important are the mistletoes in Trinidad? How are they spread about the island, how quickly and how far? This is the type of question which one needs to be able to answer before knowing which way to turn in determining any really effective control measures.

The reader will realise that much of the information collected and ideas presented in this report will need much further detailed and careful study before being accepted as proven fact.

I consider, however, that the work should provide a reasonable groundwork to facilitate a greater understand of the Loranthaceae in Trinidad.

Before 1900 the relationship between the mistletoes of Europe and their hosts was thought to be one of symbiosis rather than parasitism but today definite host-parasite relationships are recognised.

Translocation of metabolites from parasite to host does actually take place (Gehringer 1913a; Moirish in Teubner 1923; Winkler 1913; in Gill and Hawksworth 1961).

In these experiments all the leaves were removed from the host leaving only the mistletoe foliage to sustain it. It was found that it was possible for the parasite to sustain the host for some time but never for the normal life span. This fact is borne out by Kuijt (1964).

It would appear too that many trees are fairly tolerant to minor attacks of parasite but this tolerance does not indicate any gain derived by the host and in fact harmful toxins are almost certainly passed into the host.

A new notion on this type of parasitism is that it may be the hormone system which is interfered with. (Tindley 1956). The frequent swellings which one often finds at the point of direct parasitism could be basipetal extension of hypertrophy caused by the parasite (*V. album* in this case). He suggests that there could be a relation with basipetal production of