

FLORIDA'S STAKE IN PLANT QUARANTINE ENFORCEMENT

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As everyone knows, injurious insects and plant diseases constitute serious obstacles to agricultural production. This seems to be true the World over. Fortunately or unfortunately the destructive organisms that cause greatest losses in one part of the World may not occur in others. This feature of their distribution gave rise many years ago to efforts in various parts of the World to set up restrictions aimed at protecting the agricultural industry of one country from plant pests known or believed to occur in another. These restrictions which we call quarantines were in effect in some parts of the World long before the United States first gave consideration to its need for similar plant-pest protection. By 1912 when this country first enacted legislation for this purpose many injurious insects and plant diseases had found their way here and had become established. As fruit and vegetable production is particularly vulnerable to attack by these organisms, many States were united in urging upon Congress the need for action. The State of Florida, because of its tremendous production of these articles, was and continues to be one of the leaders in urging the need of some means of screening the arrival here of additional plant pests. Florida is particularly vulnerable because of climate, crop specialization, geographical location, and proximity of serious insect pests and plant diseases within easy reach of Florida ports by air and water.

In 1912 Congress passed the Plant

Quarantine Act authorizing the Secretary of Agriculture to promulgate rules and regulations to safeguard the importation into this country of nursery stock, fruit, and other plant products. It has been the policy of the Department to take such action on a biological basis. Care has been taken to avoid the use of this authority in furtherance of economic or competitive conditions. Quarantines that have been promulgated have been aimed at specific subjects and have been accompanied by minimum restrictions consistent with the objective of protection from insect pests or plant diseases not known to occur or to be widely distributed within this country. The restrictions issued under this legislation by the Secretary of Agriculture have varied during the years, depending to some extent on the nature of the material which formed the large percentage of the imports, upon information with respect to pest risks, and upon the advisability of the application of methods of treatment to safeguard the importations.

Much of the information on which plant quarantines have been put into effect through this authority by the Secretary of Agriculture has been accumulated by the Bureau of Entomology and Plant Quarantine. In the case of plant diseases the basic information has frequently been furnished by the Bureau of Plant Industry, Soils, and Agricultural Engineering. In the case of every foreign plant quarantine the objective has been to get the most accurate knowledge possible with respect to the distribution of the insect or disease, ways in which it might be transported, materials on which it would be most likely to be carried, the possibility of destroying the organism through the

application of treatments at destination or port of entry, and the probable damage likely to occur in this country in the event of its introduction. In general the policy on which quarantines have been established has been to consider the biological necessity to exclude a specific plant pest and then to provide such restrictions on the importation of the plants or parts thereof which serve as the host as will most adequately protect domestic agriculture.

With the passage of the Plant Quarantine Act the responsibility for dealing with foreign quarantine problems was placed on the Federal Government.

Plants and other restricted commodities imported into this country are considered to be in foreign commerce until actually arrived at the point of destination. It has been held by legal advisers of the Department that the States do not have authority over such commerce until delivery to the ultimate consignee. At that point under the State police powers the State plant quarantine officials have authority to make inspections and take appropriate action.

As a result of research, much of which has been done by the Bureau of Entomology and Plant Quarantine, means have been developed to destroy injurious insects on various types of commodities through the use of commodity treatments. These methods of treatment are required as a condition of entry for many different kinds of plants and plant products. Temperatures, both hot and cold, for specified periods of time, poison gases, and various insecticidal dips may be required. These methods of treatment may be prescribed in some cases after inspection as a precaution and in some cases are required as definite conditions of entry. In the case of fruits originating in countries where fruit flies of various species are known to occur, the time-temperature treatments are required as

a condition of entry. There are 3 general procedures under which these treatments may be applied: (1) At port of entry under the supervision of representatives of the Bureau; (2) in the country of origin and at the present time this is applicable only to Mexico where arrangements have been made whereby representatives of the Bureau may do such work at the expense of the exporters, and (3) the application of the treatment in transit. It has been found that the temperature and the exposure duration are not the same for all species. More extreme temperatures and longer time intervals are needed for some. These commodity treatments are effective when properly applied and with experience it has been possible to simplify and standardize equipment and procedures to make their application more effective and less costly.

One of the serious problems is our inability to recognize the symptoms of, or to control, that class of diseases which is caused by the presence of a virus. In the inspection of nursery stock entering the United States it has been found impossible through inspection at the ports of entry to be sure as to the presence or absence of a number of virus diseases. It was primarily because of the need to strengthen our protection against virus diseases accompanying imported nursery stock that led to the revision of Quarantine 37, the Nursery Stock, Plant, and Seed Quarantine, a few years ago providing the requirement of growing the material for a specified period of time in post-entry detention to permit inspection during one or more growing seasons.

It is recognized that postentry procedures leave something to be desired. It is not the best procedure to bring plants into this country, establish them in our soil, and then await the possibility that they may have brought some serious infestation or plant disease. It is

believed, however, that inspection during the growing season offers the best chance to detect the presence of virus diseases in plants. It is hoped that it may be possible to arrange that our inspectors may examine the material in the country of origin. Inspection of the growing material in the nurseries abroad and the rejection there of material which appears to threaten our welfare would seem to be more practicable and effective. If the means and the trained men were available to inaugurate such a program it would be necessary that there be an invitation from the countries involved to make the inspections within their borders. Some progress has been made in this direction. Inspectors of the Bureau have visited a few countries on specific errands involving the inspection and application of treatments for the safeguarding of materials destined to be shipped to this country. It is believed the recognition of the advantages of this method of procedure will grow and it is hoped that by this means a satisfactory substitute for the present system of postentry inspection may be developed.

A step in the direction of more effective international cooperation was taken when the United States was represented at the recent International Conference on Plant Quarantine Regulations convened by the Netherlands Ministry of Agriculture at The Hague. This initial conference resulted in a draft of an international agreement which is now before the countries concerned for consideration. Its provisions include: Statements of Purpose and Responsibility; Supplementary Agreements under the Convention; Establishment of National Organization for Plant Protection; Requirements in Relation to Exports; Requirements in Relation to Imports; International Cooperation; Amendment of Convention; Settlement

of Disputes; Treatment of Non-adhering Countries; Ratification and Adherence, and Effective Date. From participation in this Convention it is believed the United States should benefit. The question has been asked whether this would mean that the Federal inspectors would have to accept certificates from officials of other countries. The answer to this is no. We do not have to accept their certificates now and the proposed standardization would not modify this authority. To my knowledge no agency of the Federal Government has sought to influence decisions of the Department of Agriculture based on biologically sound requirements for imported plant material. From the standpoint of this country it is believed international discussions such as this International Agreement contemplates may afford us a chance to establish relations with other countries which it is hoped may lead to the opportunity for our inspectors to work with their inspectors in the nurseries from which shipments are made to the United States. It is our hope that this would furnish some first-hand information about the conditions surrounding the material which is offered for entry into this country.

In recent years plant pests have been transported over long distances as never before through the movement of airplanes. Planes taking off in one part of the World and landing in another all between sunrise and sunset means that living insects may be transported and become established as has not been the case with slower transportation. Florida has occasion to fully understand the consequences in terms of dangers of plant pest distribution due to the enormous increase which has taken place in international air transportation. The burden of inspection which has fallen on the Florida State Plant Board in Florida and on the

Bureau of Entomology and Plant Quarantine throughout the country is in direct proportion to the expansion in this activity. In the first 9 months of 1950, 14,500 planes from foreign ports were inspected in the State of Florida by State and Federal inspectors cooperating.

There are numerous instances of the long-distance transportation of living insects by means of airplanes. Evidence is abundant that some injurious species have been established in distant parts of the World through this means. It seems reasonable to believe that the danger of the long-distance dissemination of injurious insects through air travel is likely to increase unless definite measures are taken to prevent. With this objective experiments are being conducted to develop insecticides to be applied to interiors of airplanes. Planes from Hawaii are sprayed before departure from the Mainland, careful inspection is being made of foreign planes on arrival at the airports in this country, and representations have been made to the agricultural officials of other countries looking toward their adoption of precautions which might be of protection to them as well as to us.

Florida is interested in the status of the diseases of citrus known as mal secco, quick decline and tristeza, and of the infestations of the citrus blackfly in Mexico and the oriental fruit fly in Hawaii.

In Mexico work against the citrus blackfly has been carried on in cooperation with the Mexican Department of Agriculture and with committees of growers organized in some of the principal fruit-growing States of that country which have actively participated in the suppressive program. Infestation was found early in 1950 as close to the border as Matamoros just across the Rio Grande from Brownsville. This was a light infestation found on one

tree on a property within a few doors from the bus station which leads to the belief that the insect may have reached that point in connection with bus travel from interior points of Mexico. That infestation is believed to have been eradicated and no recurrence has been found to date despite frequent and careful inspections. Bus travel is interrupted at the border as the vehicles themselves do not cross. The question whether the insect may be carried as a hitch-hiker on traffic crossing the line, however, is under investigation. This involves the possibility of spraying such vehicles in connection with their crossing and search is being made for a suitable spray.

Infestation now occurs in the City of Monterrey where spraying is being carried on at all points where living citrus blackflies are known to occur. Other infested areas in Mexico where suppressive measures are being applied include Victoria and one or two points between Victoria and Monterrey; also in the vicinity of Valles in the State of San Luis Potosi about 300 air miles south of the border where rather heavy infestations of the citrus blackfly have occurred over a period of several years. At that point a Bureau spray program is in progress on selected properties to demonstrate that fruit production can be restored if proper sprays are applied at the right time.

On the West Coast the infestations which were found in the vicinity of Guaymas and Empalme have been subjected to several spray applications. In this area it will be recalled the first suppressive measures were put into effect by the fruit growers of Arizona and California who contributed funds and sent their own men to supervise the program. In this initial effort the Bureau cooperated by determining the limits of infestation to the northward in cooperation with the Mexican Depart-

ment of Agriculture. The number of infested properties has been steadily reduced as well as the intensity of the infestation.

In Cuba the citrus blackfly was found to be readily controlled by parasites. These same insects taken to Mexico and liberated there have not proven to be equally effective. It will be recalled that there was an infestation of the citrus blackfly in south Florida on Key West a number of years ago. Resort was not made to natural control at that time as it was deemed desirable to completely eradicate the infestation if possible and after a spray program of some duration in which the Bureau cooperated with the State Plant Commissioner, it is believed the infestation was completely wiped out. Parasites were imported into Mexico during the season 1948-49 from Malaya. There was difficulty in making these introductions because the infestations were on citrus in that country. Because of the danger of bringing citrus canker infested material to Mexico the procedure was to take potted citrus trees from Mexico to Malaya, there infest them with the citrus blackfly, then introduce the parasites, cage the infested plants and ship by water. Little success attended these efforts, perhaps because of the long period of time involved. In the season of 1949-50, parasites were collected in India. In this instance it was possible to secure infested non-citrus leaves carrying the parasites. These were shipped at frequent intervals by air and a large amount of the material came through successfully. Sufficient time has not yet elapsed to permit an evaluation of the effectiveness of these beneficial insects. It would very greatly lessen the concern of the fruit growers of this country if biological control of the citrus blackfly in Mexico should prove to be effective.

With respect to the oriental fruit fly

situation in the Hawaiian Islands, a very comprehensive research program was undertaken in the beginning of the fiscal year 1950 with funds made available by the first session of the 81st Congress. The work was divided into five main projects:

- (1) Biology and habits of the fruit fly
- (2) Treatment of agricultural products grown in infested areas so that they may be transported safely into uninfested areas
- (3) Search for insecticides that will kill the insect
- (4) Large-scale control and eradication studies
- (5) Biological control

The work in these lines of investigation has been vigorously prosecuted. The importations of beneficial insects have been very encouraging. A number of the imported species have been recovered from various parts of the Islands showing that they have become definitely established and at some points the parasitization has reached an encouraging level. Active cooperation in the studies directed against the oriental fruit fly is being received from California and from Hawaii. The California State Department of Agriculture and the Citrus Experiment Station of the University of California have been actively cooperating. They have loaned men to this undertaking and accepted responsibility for certain activities associated with the general program. The Board of Agriculture and Forestry of Hawaii and the Hawaiian Experiment Station are also valued cooperators. The Pineapple Research Institute and the Hawaiian Sugar Planters Association Experiment Station are also giving valuable assistance.

Airplanes leaving Hawaii for the Mainland are given preflight inspection and are also sprayed in an effort to

prevent hitch-hiking fruit flies. Careful inspection and treatment of products moving to the Mainland are required. California has been carrying on a trapping program in order that if the fly should find its way there the infestation would be discovered while still in the incipient stage. The results of this trapping program have thus far been negative in California.

Plant quarantine policies and procedures have been undergoing rather frequent and rapid changes. Progress in the development of insecticides, additional information as to the distribution and abundance of plant pests, and the possibility of long-distance dissemination all have contributed to this situation. In this country the State plant quarantine officials, by working together, have made notable progress in simplifying, coordinating, and stream-

lining the State quarantines and procedures which affect interstate shipments of plants and plant products. Their organizations—the regional and the National Plant Boards—have afforded a medium for free friendly discussion of their mutual problems. It is believed that progress in dealing with other countries is possible through similar means. Long strides in this direction have been made in our dealings with our neighbors, Canada and Mexico. Working at greater distance there has been excellent ground work laid for further cooperative relationships with Argentina, Australia, and Holland. Better understandings lead to better cooperation. From our point of view better cooperation means fewer plant pests accompanying agricultural imports and that is the aim which must be kept ever before us.

POSSIBILITIES FOR THE USE OF CONCENTRATED SPRAYS ON CITRUS IN FLORIDA

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During the past few years, spray machines have been developed for applying concentrated sprays to deciduous fruit trees. The purpose of such sprays was to apply the required amount of the active ingredient to the tree with a minimum amount of water. By reducing the actual gallons of spray per tree the cost of application may be decreased both by eliminating the hauling of water and by reducing the time required to refill the spray tank. If the spray mixture is concentrated four times the ordinary strength, then there is a saving of 75% in the amount of water hauled, and a similar amount of

time saved in filling the tanks. With concentrated sprays such a low volume of fluid is delivered per tree that no run-off or dripping occurs. The purpose of this paper is to present results on the use of concentrated sprays on citrus in Florida.*

The first concentrate type sprayers to be used on citrus in Florida were tested by King and Griffiths (2) in 1947. Two machines (Buffalo Turbine and Hessian Microsol Generator) were tested in the control of the American grasshopper in citrus groves. These machines gave very poor insecticide distribution on the tree. In spite of this, relatively satisfactory grasshopper control was obtained. However, it was concluded that

*For those readers who desire information concerning the history and theory of concentrated sprays reference is suggested to a thesis by R. M. Pratt (6).