

Some Notes on the Susceptibility of Avocados in Mexico to Attack by the Mexican Fruit Fly

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The susceptibility of avocados to attack by the Mexican fruit fly (*Anastrepha ludens* Loew) has become increasingly important. This is due to the recent trapping of flies near the California-Mexican border, the increasing interest in the varieties suitable for growing in the lower Rio Grande Valley of Texas, and the difficulties involved because of lack of a safe, effective treatment to permit shipment under quarantine.

In May 1956 a study of infestation in avocados by this fly under both field and laboratory conditions was undertaken. Thus far 15 states in Mexico have been covered or visited in part in a preliminary survey to locate plantings suitable for this work (Figure 1). The average annual rainfall and average number of days with frost in Mexico, based on the period 1931 to 1930, are shown in Figures 2 and 3, respectively.

Information on the more important areas covered may be of interest to those planning visits into Mexico in search of new avocado varieties.

Areas of Major Interest for Avocado Selection

Queretaro-Guanajuato Area.—In view of the necessity for the selection of cold-resistant varieties suitable for the Rio Grande Valley, the plantings in and around the towns of Comonfort and Rinconillo in the state of Guanajuato, and La Canada, Taliman, Queretaro, and San Juan del Rio in the state of Queretaro appear promising. Here there are many groves planted from selected seed apparently of Mexican, Guatemalan, and West Indian races and their hybrids growing at altitudes between 6,000 and 7,000 feet. The annual rainfall is between 15 and 30 inches (400 and 800 mm) (Figure 2), and in normal seasons the fruiting time is between May and August. For several years this area has had heavy freezes that damaged 50 to 70 per cent of the avocado trees (Figure 3). Some, however, came through with no apparent ill effects.

A great deal of trouble with insect pests is encountered here and some trees have been dying back from the cinnamon fungus (*Phytophthora cinnamomi*). These factors should make this area particularly suitable for selection of resistant varieties.

Northern Veracruz and Puebla Area.— A second area of interest is in the northern parts of the states of Veracruz and Puebla, including the towns of Tezuitlan, Jacopoaxtla and the area around it, and Jalacingo. The altitude is for the most part above 6,000 feet and a heavy annual rainfall between 30 and 60 inches (800 and 1500 mm) (Figure 2) with freezing temperatures almost every year (Figure 3). Deciduous fruits are also grown with avocados planted as border rows in some orchards. However, most avocados are growing as yard plantings or in small groves.

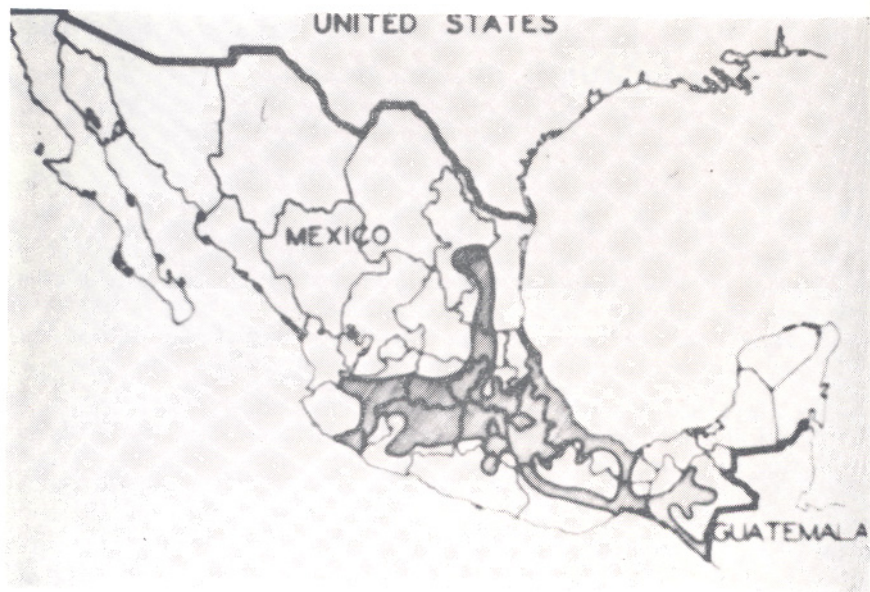


Figure 1. Map of Mexico showing area covered in study of susceptibility of avocados to attack by the Mexican fruit fly.



Figure 2. Annual rainfall in Mexico, 1921 to 1930.

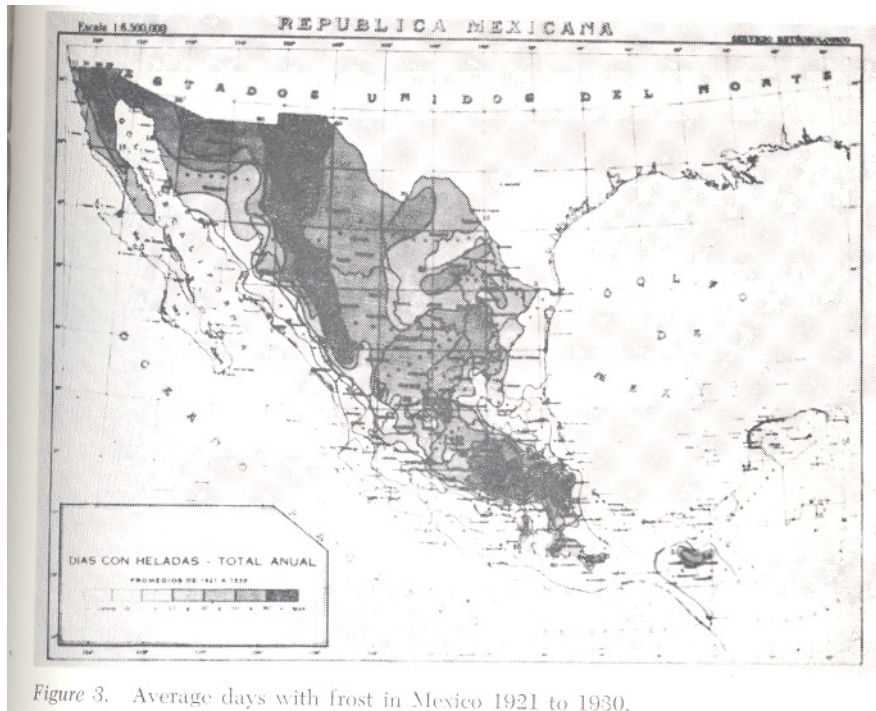


Figure 3. Average days with frost in Mexico 1921 to 1930.

Most of the pests found in the Queretaro-Guanajuato area are also found here except for the cinnamon fungus. Most of the trees are of the Mexican race with a possibility of Mexican-West Indian hybrids. The main fruiting season begins in May and ends in July.

State of Mexico.— In the state of Mexico at altitudes up to 8,000 feet several plantings of avocados have been reported that have not been visited. Most of this state has freezing temperatures every year.

San Cristobal de las Casas and Vicinity.—The area north of San Cristobal de las Casas in the state of Chiapas is between 6,000 and 8,000 feet in altitude and has some of the heaviest rainfall in Mexico, ranging between 70 and 150 inches (1800 and 3800 mm) per year (Figure 2). Once every three to five years there are freezing temperatures (Figure 3). The Guatemalan-type avocados growing in this area show considerable cold tolerance. This is also true of the area northwest of Tapachula along the Mexican-Guatemalan border. Here there are several extinct volcanoes reaching heights of 10,000 to 13,000 feet. Avocados are growing on their slopes, but can be reached only by horse or on foot through some very rough country.

Though Chiapas has a very heavy annual rainfall, no cinnamon fungus was found. In fact, few avocado pests seem to thrive in this part of Mexico.

San Angel de Ziracuaratiro.— This locality in the state of Michoacan has some very old avocado trees. Some trees are claimed by the natives to be one hundred to two hundred years old. Some are so large that rope systems have been installed to permit pickers to reach the fruit. Most, if not all, of these trees are pure Mexican and produce excellent fruit. No freezes are reported for this area, which lies about 30 miles east of Uruapan. The fruiting season is between April and July.

Preliminary Infestation Results

From time to time avocados infested with the Mexican fruit fly have been intercepted at the United States-Mexican border. They had also been found in the market and collected in the field prior to this study. However, in May and June 1955, J. M. Ramirez of the USDA Plant Pest Control Branch, accompanied by F. Islas and E. Jimenez of the Mexican Department of Agriculture, found no infestation in 4,774 avocados dissected in the field.

In the survey made in 1956 samples of avocados were returned to the laboratory where the fruit was held over moist sand to permit any larvae present to mature, leave the fruit, and pupate. This system gives a better indication of infestation than field dissection. By this method 165 *Anastrepha* flies were recovered from 3,839 avocados, giving an infestation index of 4.3 larvae per 100 fruit. Not all proved to be the Mexican fruit fly. In one collection made in Tapachula, in the state of Chiapas, 48 flies of *A. serpentina* were recovered. This is another species of fruit fly found occasionally in the Rio Grande Valley.

In most collections of avocados a small fly, *Carpolonchaea pendula* Bezzi, belonging to the family of hunchback flies, *Lonchaeidae*, has been recovered in large numbers. This fly is reported to be a scavenger, but in several collections has emerged from sound fruit. In the course of studies on the Mexican fruit fly, *pendula* has been reared from 22 species of fruit, so it has a fairly wide host range.

Three collections of avocados were made in Jungapeo, state of Michoacan, from trees interplanted with mangoes. On the first collection in late March, before the mangoes had matured, 34 Mexican fruit flies were recovered from 445 avocados. In late April a second collection of 1,600 avocados produced only 5 flies, and in early June, at the peak of the mango season, no flies were recovered from 900 avocados. All collections were made from the same general area and included many varieties. These findings indicate that avocados are not a preferred host, but in areas where primary hosts are abundant and develop heavy local fly populations, avocados may become infested when more suitable fruits are not available.

From the results gathered so far there seems to be some evidence of resistance in avocados to insect attack. This phase of the study will be given more attention this year when fruit becomes available. Resistance should not be overlooked when selections are made.