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COFFEE RUST

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COFFEE RUST, Hemileia vastatrix

A Supplemental Report\*



*Hemileia vastatrix*

\* Prepared by the UC/AID Medfly Multidisciplinary Study Team, May 1977. (Team members were Wallace C. Mitchell, Chris O. Andrew, Kenneth S. Hagen, Richard A. Hamilton, Ernest J. Harris, Kenneth L. Maehler and Robert H. Rhode)

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## Coffee Rust, Hemileia vastatrix

When monsoon winds from India blew coffee rust spores into Ceylon a century ago the results were catastrophic. A thriving coffee industry involving plantings of over 600,000 acres was virtually wiped out in a few years. The disease was first discovered in Ceylon in 1867. Between 1879 and 1893, after it had become well established, exports of coffee dropped to less than 7% of former shipments. Information on the disease at that time was minimal and a scientist was hired who established that the disease was caused by a fungus which produced millions of airborne spores that infected the coffee leaves on which they came to rest. Despite efforts to control the disease, it spread like wildfire. Today Ceylon (Sri Lanka) raises little coffee and virtually all plantings have long ago been replaced by tea.

In the Philippines in 1891, coffee rust cut the harvest 35%. In Java, rust practically destroyed the coffee plantations and the planters turned to hevea rubber as a substitute crop. The disease appeared in Puerto Rico in 1903, but prompt and drastic action, including the destruction of all infected plants, eradicated the disease.

With such a history, is it any wonder Central American countries are concerned and alarmed with the coffee rust in Nicaragua?

The first symptoms of the disease are the appearance of small, yellowish, translucent, oily spots which early show a powdery coating of spores on the under surface. As the spores mature, the spots turn orange to red. The aged lesions become brown surrounded with a yellow rust band. Defoliation follows to the extent that many branches may have only a few leaves which ordinarily would have 15 or 20 pairs of leaves. Such infected trees are stunted, cannot produce and eventually die after a few years.

Spores of the rust are long lived, withstand drying and may be easily transported on live plants or as an invisible dust from one country to another. All varieties of C. arabica grown in the Americas are highly susceptible to most races of Hemileia rust.

Today, Hemileia vastatrix is found in most coffee growing regions of Africa, the Near East, India, Asia, the Pacific Islands and more recently, South and Central America.

The disease was found Nov. 23, 1976, in the state of Carazo, Nicaragua on the farm of Mr. William Arevalo in an area of 16 manzanas

of coffee, by Ing. James Solorzano, an employee of the National Bank. It presently covers about 6,000 manzanas and a quarantined area of 10,000 mz. has been established. A dozen quarantine check points have been established around the quarantined area and all vehicles leaving the area are sprayed with copper fungicide. At each of these check points, a team of three men applies a spray to the wheels and underside of the vehicles with a small power sprayer. There are presently 40 men employed in this interior quarantine.

The UC/AID Medfly team made a point of staying out of the coffee rust quarantined area. We did not wish to get spores on our clothing or be accused of inadvertently spreading the disease. We talked with many agriculturists, coffee growers and consultants and while the conversation began with medfly, it was obvious that their concern for the medfly was overshadowed by the threat of the coffee rust. The general opinion often expressed was that it was just a matter of time until coffee in other CAP countries would be infected. It was stated that they believed the rust came from Brazil.

We were told that 700 men were working in the quarantined area applying copper spray, roguing and burning infected plants. About 17,000 acres are presently involved.

One coffee consultant said that there were about 30 races of coffee rust and that the one in Nicaragua was Race 2. It was found in Brazil in 1970 and has caused great damage there. Arabica coffee varieties grown in CAP countries are generally susceptible to the rust. Experts believe that possibly the only solution may be to develop resistant strains which may be lower yielding and poorer in quality.

Nicaraguan officials believe that in spite of the coffee rust disease, coffee production in the country will eventually increase by an estimated 35% over current levels. This paradoxical opinion is based on what seems to be happening in Brazil, where coffee rust has been a problem for several years. In that country, it is the large growers with the necessary technical and financial resources who are contending successfully with this serious pest. The application of properly timed chemical and cultural control measures have resulted in increased coffee yields.

At present, very few growers in Nicaragua are engaged in the technical cultivation of coffee. A regimen of fertilization and cultural practices are not generally followed. In order to cope with coffee rust, it is estimated that in the future, growers will need a yearly investment of about 2,000 cordobas/manzana (\$322 US/acre) to meet the cost of spray materials, equipment, fertilizer, pruning and shade adjustment.

In all likelihood, the small farmer with his limited income will not be able to afford the necessary costs of controlling the coffee rust, nor will he want to become involved in the financial intricacies of acquiring a loan and making the required interest payments. In this situation, the small farmer with his deficient technical and financial means will constitute a threat to the large grower who does make an attempt to control the disease. Face with the constant danger of nearby sources of infection the inevitable demand of the large grower will be for the destruction or control of these uncared-for plots.

It is reported that of Nicaragua's 17,000 coffee growers, 16,000 have holdings of less than 17 acres. This fact brings forth the obvious questions: What will be the fate of the small farmer? Can he be induced to grow crops other than the traditional coffee? If so, what crops and who will provide him with needed technical guidance? No action or inept decisions on the part of responsible authorities to solve the future plight of the small grower conceivably could lead to serious social and economic disruption.

George Berg, FAO/UNDP Project Manager, stated that he had received \$162,000 to be spent on coffee rust, but the type of program was not identified. The cost of the interior quarantine presumably is borne by the country involved. The treating of vehicles crossing national boundaries with fungicide is at least partially defrayed by charging the driver the equivalent of US \$1.

In some countries, including the French Cameroon, Kenya and Tanzania, the state of Mysore and the Coorg District of the Nilgiri Hills in southern India, growers control the disease by two or three annual spray applications of Bordeaux mixture. The sprays are applied just before the heavy monsoon rains begin and again in the dry spell before the light monsoon rains. Sometimes a third spray is applied after the light rains. Few rust spores are produced during the dry season. Likewise, little new leaf surface is developed by the coffee. When the rains begin both coffee and rust begin to grow. Planters keep about 70% of their coffee foliage from being infected with rust by careful, well-timed spraying. Where the dry season is not as well defined, as in Ceylon, Java, Malaya and the Philippines, weekly or monthly sprays are needed to control rust. Such treatments obviously increase production costs considerably.

In some countries, coffee plantings have been moved to higher elevations where cooler temperatures reduce production of the coffee, but allow it to grow with less damage from rust.

In many airports and offices visited, posters and notices to be on watch for coffee rust were observed. Presently in CAP countries, the major concern is coffee rust with medfly clearly a low priority problem.

It has been known for more than 75 years that coffee cultivars have limited resistance to some races of Hemileia rust. Some have been brought to the afflicted areas in S.E. Asia. At first they were grown with success, but later succumbed to rust. This phenomenon was studied over 50 years ago in India. Rusts develop biological races, which attack new coffee varieties selected for resistance to old rust strains. The races are the result of mutations and no alternate host relationship has been found in producing new races of rusts.

Coffee breeders have been able to secure Arabian coffee cultivars with sufficient resistance so they will grow well in the presence of some, but not all, races of rust. Seeds from rust resistant varieties have been obtained for growing in the Americas. After careful disinfection and other prophylactic measures to assure freedom from all diseases and insects, limited amounts of some of these new coffees are being tested in the Western Hemisphere.

In general, it seems that if the worst situation were to result from the rust, implications concerning citrus and other export crops could be significant. That is, if the rust created the same long-term impact in Central America as in Sri Lanka, then the CAP countries would need to expand exports such as citrus where the medfly could have an impact. In that event these countries might become quite concerned with various problems, including the medfly, that presently limit production and exports of citrus. This would be a long run impact, however, and would require careful consideration of many alternatives concerning medfly control and U.S. programs to treat fruit bound for quarantine concerned countries. If the rust simply cuts production and improved varieties are able to cope with the problem, the short run implications are that coffee producers will remain better off simply because the rust provides a supply control mechanism to raise prices. In the longer run, with improved varieties production probably would increase to move the coffee production-distribution system back to some degree of normality.

Of particular interest is the attached annual report for 1976 from the Ministerio de Agricultura y Ganadería, Departamento de Sanidad Vegetal, which details the actions that have been taken to contain the coffee rust in Nicaragua.

Translated from the Nicaraguan Department of Plant Sanitation's Annual Report for 1976, "Ministerio de Agricultura y Ganadería, Dirección General de Agricultura, Departamento de Sanidad Vegetal, Informe Anual del Departamento de SAVE Correspondiente al año 1976."

An event of grave consequence for our country occurred this year in the state of Carazo, namely the appearance of the disease called "coffee rust," Hemileia vastatrix, and specifically in the farm of Mr. William Arevalo and over an expanse of some 16 manzanas of coffee. This disease was found for the first time on November 23rd of this year by Ing. James Solorzano, employee of the National Bank.

The presence of such a destructive disease in the country has brought as a consequence a considerable paralyzation in agricultural exports with consequent losses to the country's economy as well as a large monetary donation from the government of the Republic to the plan for eradication of this disease.

The Department of Plant Sanitation, in accordance with the law which created it and on the basis of Article No. 9, established an internal quarantine and has been responsible for providing the legal basis for carrying out all the work in the campaign against this pest, not only in the quarantine aspects but also in that relative to the legal entry of the "scout" technicians who are in charge of roguing and defoliation.

#### Quarantine

On November 28th, the order for installing a quarantine station against "coffee rust" was received. This was immediately accomplished with the installation of nine control stations with the principal or control station being the entrance to Beneficio Santiago, which lies on the Jinotepe Highway, San Marcos.

Taking advantage of the network of roads in the zone and taking into account that the discovered outbreaks did not exceed an area greater than 56 manzanas, the control stations for vehicles and pedestrian traffic were located as follows:

Station No. 1 - Entrada Beneficio Santiago  
" " 2 - La Providencia  
" " 3 - El Tanque  
" " 4 - Las Breñas  
" " 5- Entrada por lado Norte Beneficio Santiago  
" " 6 - Ofir  
" " 7 - Los Rieles  
" " 8 - Las Breñas Carreteras  
" " 9 - Camino Santa Rosa

This area encompassed an extension of approximately some 5,000 manzanas which were shown to be well controlled from the initial date until December 16th when it became necessary to expand the quarantined area because of the appearance of an outbreak on the Santa Cecilia farm in Diriamba. This induced us to move the quarantine toward La Reforma, El Zompopal road, Santa Cecilia and Dolores; with this the quarantined area reached an area of 3,000 manzanas.

This sanitary perimeter, as it was called, gave us hope of maintaining a better control - up to January 8th there had been no outbreaks outside of the quarantined area - to the extent that at Station No. 1 silo up to 50,000 persons and 500 vehicles were treated daily.

Because of unforeseen circumstances, it was not possible to establish a complete or absolute quarantine, but it is emphasized that the quarantine is attaining the objective that had been proposed for it.

On January 8th, by direct order, the sanitary perimeter established to date with great success was suspended and an external quarantine was established which encompassed the block of Carazo, Jinotepe and San Marcos; in this block an area of 9,000 manzanas is found.

On the 9th, initiation date for the new quarantine measures that comprised lower pressure for the coffee farmers and the general public, the 13 total stations were placed thus:

- 1 - Carretera Jinotepe/Nandayme
- 2 - El Barrio
- 3 - Gancho Camino
- 4 - Las Breñas
- 5 - Los Rieles
- 6 - El proveni - Todo en carretera, Jinotepe/San Marcos
- 7 - Carretera San Marcos/Masatepe
- 8 - Camino La Concha
- 9 - Camino Las Nubes
- 10 - Las Carolinas
- 11 - Motel Olimpo
- 12 - Las Esquinas
- 13 - La Pollera - Todo carretera San Marcos/Las Esquinas

With this modification and with the change in politics, the roguing of coffee shrubs within the quarantined area was re-established; for this purpose, the Department of Plant Sanitation named 26 new inspectors as watchdogs over the roguing; the latter had the job of not permitting the traffic of persons within the infested areas and/or were in the process of applying this treatment (Sicaron + Copper Agral and Detergent or Copper Agral and Detergent) in protected areas.

In the Las Esquinas, Jinotepe, Las Carolinas, La Concha and El Barrio Stations, teams of inspectors, in groups of 6, were established in 12 hour shifts around the clock with the order to stop and treat every vehicle, as well as the people, which were in transit traveling out of the quarantined zones, remaining in effect to this date.

The roguing teams as well as the dessicating and quarantine teams have been working as an unit with the hope of eradicating the "coffee rust".



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INFORME ANUAL DEL DEPARTAMENTO DE SAVE  
CORRESPONDIENTE AL AÑO

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En el presente año aconteció un hecho de grave consecuencia para nuestro país como fué la aparición en el Departamento de Carazo, la enfermedad denominada "La Roya del Cafeto", (*Hemileia vastatrix*) y específicamente en finca del señor Guillermo Arevalo y en una extensión de unas 16 manzanas de café, esta enfermedad fué encontrada por primera vez por el Ing. Jaime Solorzono, empleado del Banco Nacional, el día 23 de Noviembre del presente año que se informa.

La presencia de tan devastadora enfermedad en el país ha traído como consecuencia la paralización en gran parte de exportación de café, carácter agrícola con las consiguientes pérdidas a la economía del país, así como a la fuerte erogación económica que el Gobierno de la República ha hecho en el plan de erradicación contra la enfermedad.

El Departamento de Sanidad Vegetal, de acuerdo a su Ley creadora y en base al Art. No. 9 estableció una cuarentena interna y ha sido el que ha dado la base legal para llevar a cabo toda la labor de la campaña contra esta plaga tanto en la parte cuarentenaria como es también lo relativo a penetrabilidad por parte de los técnicos rastreadores como los hombres encargados de resepar y defoliar.

C U A R E N T E N A

El día 28 del mes de Noviembre se recibió la orden de instalar un puesto de Cuarentena contra La Roya del Cafeto, labor que fué realizada de inmediato con la instalación de nueve puestos de control teniendo como puesto principal o de control la entrada al Beneficio Santiago, que queda en la Carretera Jinotepe, San Marcos,

Aprovechando la red de caminos de la zona y tomando en cuenta que los brotes encontrados no excedía de una área no mayor a las 56 manzanas, se ubicaron los puestos de control de vehículos y personas, fué así :

Puesto No. 1	Entrada Beneficio Santiago
" 2	La Providencia
" 3	El Tanque
" 4	Las Breñas
" 5	Entrada por lado Norte Beneficio Santiago



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Puesto No.	6	Ofir
"	7	Los Rieles
"	8	Las Breñas Carreteras
"	9	Camino Snta Rosa.

Esta area abarcaba una extensión de aproximadamente unas 5000 manzanas las que mostraron estar bien controlada por motivo de que desde la fecha de inicio hasta el día 10 de Diciembre que hubo necesidad de ampliar la cuarentena por la aparición de un brote en finca Santa Cecilia de Diriamba, lo que nos indujo a mover la cuarentena hacia La Reforma, camino El Zompopal, Santa Cecilia y Dolores, con esto el area cuarentenada llegaba a un area de 3000 manzanas.

Este cordon sanitario como se le nombró, hasta el 8 de Enero no habian aparecido brotes fuera del area cuarentenada, lo que nos dió esperanzas en mantener un mejor control al extremo de que en un silo puéto el número 1, se fumigaba hasta 50.000 personas diarias y unos 50 vehiculos.

Por motivos de fuerza mayor no fué posible establecer una cuarentena completa o absoluta pero se repite que la cuarentena esta llenando a cabalidad la meta que se habia impuesto.

Por ordenes superiores el día 8 de Enero, se suspendió el cordon sanitario establecido a la fecha con gran suceso y se procedio a establecer la cuarentena externa, que abarca el bloque de Carazo, Jinotepe, San Marcos en este bloque se encuentra un area de 9 mil manzanas.

El día 9 fecha de instalación de las nuevas medidas cuarentenarias que comprendian una baja presión hacia los agricultores y publico en general, se colocaron los puestos 13 en total así :

- 1° Carretera Jinotepe Nandayme
- 2° El Barrio
- 3° Gancio Camino
- 4° Las Breñas
- 5° Los Rieles
- 6° El proveni - Todo en carretera, Jinotepe San Marcos.
- 7° Carretera San Marcos Masatepe
- 8° Camino La Concha
- 9° Camino Las Nubes
- 10° Las Carolinas
- 11° Motel Olimpo



- 12° Las Esquinas
- 13° La P<sub>o</sub>llera - Todo carretera San Marcos  
Los Esquinas.

Con esta modificación también se estableció de nuevo con el cambio de política a permitir el corte del café dentro del área cuarentena, motivo por el cual el Departamento de Sanidad Vegetal, nombró a 26 nuevos inspectores como vigilantes de cortes los que tenían la función de no permitir el tráfico de personas dentro de las áreas infestadas y/O que estuvieran en proceso de aplicación ya fuera esta curativa (Sicaron + Cobre - Agral y Detergente o Cobre - agral - Detergente) en áreas de protección.

En los puestos de las Esquinas, Jinotepe, Las Carolinas, La Concha y el Barrio, se establecieron grupos de inspectores en números de 6 por turnos de 12 horas hasta cubrir las 24 horas diarias con lo orden de parar, fumigar todo vehículo en tránsito hacia fuera de las zonas cuarentenadas así como a las personas, permaneciendo así a la fecha.

Tanto el Rastro como recepo Deseccantes y Carenteno han estado trabajando en grupo unido con la esperanza de erradicar La Roya del Café.

#### ASPECTO GENERAL SOBRE CUARENTENA INTERNACIONAL

Con la aparición de La Roya del Café, en Nicaragua, se procedió de inmediato a reforzar las medidas restrictivas sobre la importación de productos Vegetales provenientes de cualquier país con el objeto de evitar la introducción de otras plagas o enfermedades que afectan las economías en los países en donde se encuentran establecidos, como es el caso de la broca del café la cual existe en Guatemala desde el año de 1971, en que el Gobierno de ese país aceptó tener dicha plaga en sus cafetales.

Actualmente Nicaragua ha establecido para evitar la introducción de la Broca del Café (*Hypothenemus Hampei*) que todo producto proveniente de Guatemala, sea fumigado antes de entrar al país incluyendo vehículos y es de hacer notar que a la fecha en los dos reconocimientos generales hechos en el país este insecto no se ha reportado su presencia.



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Departamento de Sanidad Vegetal

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Otras plagas existientes ya en los países vecinos a pesar de haberse reportado su presencia desde hace más de 6 años no han sido reportada su presencia como en el Nematodo Dorado (Heterodera Rotchiensis) el cual se encuentra en Costa Rica y Panamá, sin embargo nuestro país ha tomado medidas que propenden a proteger el país de la introducción de esta plaga, lo contrario de lo hecho por los restantes países signatarios de OIRSA, que en la presencia de La Roya del Cafeto, prácticamente han cerrado la frontera a los productos agrícolas o no agrícolas procedentes de Nicaragua incurriendo en contra de los preceptos básicos de Sanidad Vegetal el cual establece que la cuarentena no debe usarse como medidas punitivas o que conlleven restricciones políticas o económicas.

En resumen el Departamento de Sanidad Vegetal, continua siempre con la vigilancia constante contra las plagas y enfermedades que puedan penetrar a nuestro territorio Nacional.-

DEPARTAMENTO DE SANIDAD VEGETAL

*Carlos Marin J.*  
CARLOS MARIN J.

Jefe De Sanidad Vegetal



Cc: Archivo SAVE  
CHJ/Yar.