COFFEE ERADICATION IN A PREVIOUSLY COFFEE RUST INFECTED AREA IN PAPUA

DOROTHY E. SHAW*

ABSTRACT

The results of regular inspections of two areas in Papua from which coffee and coffee rust were eradicated in 1965 *are reported. Mature coffee bushes, seedlings and regrowth suckers located at some sites on some inspections were destroyed. No coffee rust was recorded during the surveys.*

INTRODUCTION

ONE probable and two confirmed outbreaks of coffee rust caused by *Hemileia vastatrix* occurred in Papua in 1892, 1903 and 1965, two being eradicated and one apparently eradicated as described in detail by Shaw (1968).

As all the outbreaks occurred within approximately 50 miles of Port Moresby, the main port of call of overseas ships and the international airport, it was decided after the successful eradication of the 1965 outbreak of coffee rust to maintain continual surveys of the previously infected areas. The surveys were to detect any coffee, either Arabica or Robusta, which may have been missed in the 1965 eradication campaign, or which had grown subsequently from fallen berries or had been sown despite prohibition on planting. The inspection teams would check any coffee found to see whether coffee rust was present, and then destroy the coffee in an endeavour to keep the whole area free so that if *Hemileia vastatrix* reached the Territory again through the main port or the international airport, there would be no host available for infection or build-up of the fungus.

Eradication of coffee from the area immediately surrounding Port Moresby would not, of course, be of use if the fungus broke out first in the main coffee-growing areas in New Guinea; these areas are in daily air contact with the airport at Port Moresby and by road and air transport with Lae, one of the largest ports in the Territory. Travellers from overseas sometimes merely change planes at Port Moresby Airport before proceeding to other Territory centres, so that there is the possibility that rust spores being passively carried on these passengers or on their effects could reach the main coffee-growing areas direct.

* Chief Plant Pathologist, Department of Agriculture, Stock and Fisheries, Port Moresby.

THE SURVEYS

The two areas under continual inspection are the Sogeri Plateau about 25 miles directly east of Port Moresby and the Rigo Subdistrict hinterland about 30 to 50 miles south-east of the port. The positions of these two areas and the other coffee-growing areas in the Territory are shown in the *Figure*.

The last coffee rust pustule seen during the 1965 eradication campaign was on 1st November, 1965. The inspections of the areas from that date until October, 1967, were reported by Shaw (1968). During the present surveys, foot patrols were used in the more easily accessible areas; in the heavily forested mountain areas of the Rigo hinterland helicopter transport was used between villages and hamlets with foot patrols at each site. The inspecting teams comprised indigenous field staff while expatriate agricultural officers carried out general supervision with spot checks for efficiency of inspection.

The former coffee plantings on the Sogeri Plateau consisted of some plots, acres in extent, on plantations and some scattered sowings on private holdings and in village gardens. The former coffee plantings in the Rigo hinterland consisted entirely of small plots in village gardens. Wherever possible growers have been encouraged to plant rubber in the former coffee areas; a few areas have grazed cattle, some became village gardens and others reverted to secondary bush.

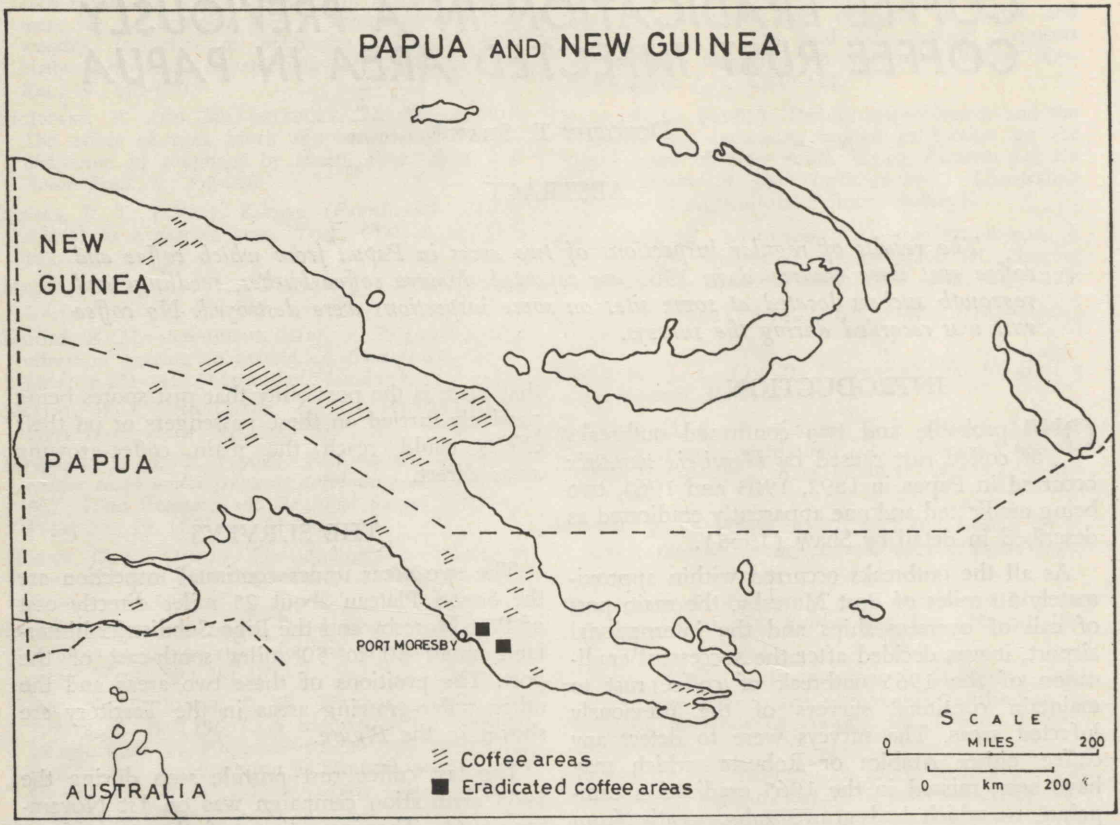

Figure.—Location of coffee areas and eradicated coffee areas in Papua and New Guinea.

The amount of coffee found during the inspections was recorded, also the locality and whether seedling or sucker regrowth, this latter being an indication of inefficient removal during a previous survey. Later it was found desirable for the teams to record approximate height of coffee found, this being an indication of its age, which in turn was an indication as to whether it had been missed during previous surveys. If seedlings were found a search had to be made to try and locate the source of the seed. Any coffee found during the survey was checked for coffee rust and then removed and burnt or forwarded to the Port Moresby laboratory for a second check for rust and size, and then burnt.

The main results of the surveys from October, 1967, until October, 1970, are summarized in the *Table*.

The variation in the number of sites inspected as listed in the *Table* arose because of limitation in the amount of helicopter time available during some patrols, of curtailment of some surveys due to weather conditions, and of the fact that some teams located new sowings or could not locate old sites.

From the results it will be seen that—

(1) no rust was recorded on any coffee found in either area, indicating the efficiency of the eradication campaign carried out in 1965;* and

* The eradication of the fungus was greatly assisted by a severe drought during which any rust spores which may have remained in the air or on other substrates after the destruction of infected coffee bushes apparently became inviable before shed coffee seed germinated at the onset of the next wet period.

Table.—Results of inspections for coffee and coffee rust in two areas in Papua from October, *1967* to October, *1970*

Area	Date of Inspection	Number of sites					
		Inspected	Recorded free from coffee	Recorded with coffee			
				Seedlings and/or regrowth			With coffee rust
				1-99 plants	100-999 plants	More than 1000 plants	
Sogeri Plateau	June 1968	23	12	10*	1*	0	0
	Sept. 1968	25	13	9	3	0	0
	Feb. 1969	26	12	8*	6*	0	0
	Sept. 1969	16	4	6*	2*	4	0
	Aug. 1970	25	10	8	5	2	0
Rigo hinterland	Feb. 1968	87	77	6	4	0	0
	June 1968	86	76	10	0	0	0
	Nov. 1968	86	79	7	0	0	0
	Oct. 1969	89	72	16*	1	0	0
	April 1970	61	55	5	1	0	0
	Nov. 1970	44	40	4	0	0	0

* Including some estimations.

(2) mature coffee bushes, seedlings and regrowth continued to be found in both areas, despite continual surveys and eradication.

As will be realized, it only needs one or two coffee plants to be missed during a few patrols and for these to flower and set seed to give rise to hundreds and in a few cases several thousands of young seedlings. If even a few berries are carried into gardens, secondary bush or forest by water run-off, birds or man, and if the resultant seedlings in turn escape notice during a few subsequent patrols and then start bearing and shedding a new crop of berries, the cycle will continue *ad infinitum*, the amount of coffee increasing or decreasing depending on the frequency and efficiency of subsequent surveys.

It was obvious that some sites were kept free from coffee by the villagers, whereas at other sites little control appears to have been carried out at all. On a few occasions new sowings were located which the owners claimed were made in ignorance of the prohibition. The most difficult site was on a plantation where coffee had previously become established in secondary bush over a wide area.

It was evident that more patrols each year would have been desirable, especially if accompanied by more trained field staff who could have been retained in the eradication work even though they also continue to carry out normal extension duties. The teams would have been able to become more *au fait* with sites and villagers, so that the work of each patrol would have been directly continued in the succeeding survey.

However, as mentioned in part previously, changes in personnel, limitations on the number of trained and responsible field staff and supervisory officers, finance for helicopter transport and availability of helicopters limited the number of inspections possible and the efficiency of the operations.

Nevertheless, it is considered that by keeping the region around the main port and international air terminal relatively free from coffee the risk of any viable coffee rust spores introduced by accidental importation finding the host in the locality has been greatly reduced.

ACKNOWLEDGEMENT

The work of the inspection teams and the agricultural officers on both the Sogeri Plateau and in the Rigo hinterland is gratefully acknowledged—on them fell the main burden of the eradication patrols. The figure was drawn by Mrs C. Crofts.

REFERENCE

SHAW, DOROTHY E. (1968). Coffee rust outbreaks in Papua from 1892 to 1965 and the 1965 eradication campaign. *Res. Bull. Dep. Agric. Stk Fish., P. Moresby*, Pl. Path. Ser., 2 : 20-52.

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