Effect of Leaf Loss During Harvest on Subsequent Yield of Coffee

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INTRODUCTION

The use of mechanical equipment to harvest coffee can result in the removal of some of the leaves during the harvest operation. It seems probable that removal of a large portion of leaves from a tree would result in a reduction in yield during the following year.

Knowledge of the relationship between leaf loss and subsequent yield is useful for evaluating the performance of harvesters which may cause leaf removal. It may also be useful in evaluating the effect on yield of loss of leaves caused by insects and diseases. A preliminary experiment was undertaken to study the effect of leaf loss on subsequent yield.

EXPERIMENTAL PROCEDURE

Eighteen mature coffee trees of Puerto Rico variety *Selección* growing at the Limaní Substation were selected for this experiment. Six treatments were used with three replicates in each treatment. Leaves were picked by hand from the trees on January 31, 1968, after harvest had been completed. The percent leaf removal was 0, 20, 40, 60, 80, and 100. During the following crop ripe coffee berries were picked five times, and the yield in grams of berries from each tree weighed and recorded.

In selecting the trees to be used in the experiment, an effort was made to select trees of uniform size and appearance. Uniformity was quite difficult to achieve, however, because of the condition of the trees. As a result, considerable variability thus existed within some of the treatments.

RESULTS AND DISCUSSION

The total yield for each tree and the mean yield for each treatment are shown in table 1. The yields for each picking and cumulative totals for the complete season are shown in figure 1.

Average yields for each treatment, as shown in figure 1, indicate a decrease in yield due to leaf removal. A linear regression equation was calculated for the effect of leaf removal on yield. The regression equation was:

$$Y = 6453.6 - 53.58\ X$$

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where

$$Y = \text{yield, g. per tree}$$
$$X = \text{leaf removal, percent}$$

The regression coefficient of Y on X was found to be $b_{yx} = -53.58$, which is highly significant. The correlation coefficient was found to be: $r = 0.7657$.

These results indicate that leaf removal should be taken into consideration in evaluating harvesting systems. No coffee harvesting equipment

TABLE 1.—*Yield data for leaf loss experiment*

Tree number	Leaf removal	Yield	Treatment mean
	Percent	*Grams*	
24	0	7473	
27	0	7313	6440
31	0	4516	
23	20	2744	
26	20	6305	5249
32	20	6700	
22	40	6865	
25	40	3132	4241
33	40	2727	
21	60	3311	
30	60	1386	3120
34	60	4563	
20	80	4586	
29	80	4017	3308
35	80	1316	
19	100	443	
28	100	91	330
36	100	456	

currently used or tested has produced excessive leaf losses; nevertheless, the possible disadvantages of moderate or high leaf removal rates should not be overlooked.

None of the trees in the experiment died as a result of leaf removal, and all trees appeared to be normal after several months except for the effects on yield.

Nonuniformity of trees within treatments resulted in quite large variability in the yields. Using a greater number of more nearly uniform trees in an experiment would probably improve reliability of results.

If leaves are removed from the same tree year after year, there may be a more pronounced effect on yield. It would seem desirable to study leaf loss over several years, and to carry out experiments with a more uniform and better controlled selection of trees.
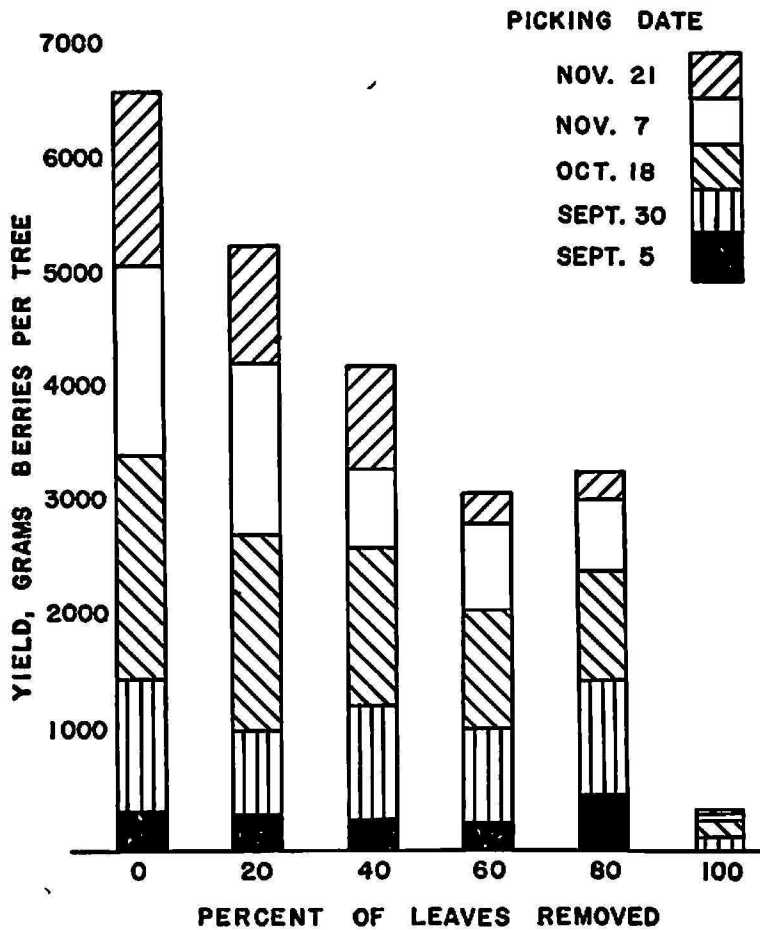

Fig. 1.—Effect of leaf removal on subsequent yield of coffee trees, showing average yields from individual pickings and cumulative total average yields for each treatment.

SUMMARY

Leaves were removed from coffee trees after harvest at six percentage levels: zero percent (control), 20, 40, 60, 80, and 100 percent. A linear regression equation determined from the experimental results showed that yields declined as percent leaf removal increased. The effect of leaf loss should be taken into account in evaluating coffee harvesting systems.

RESUMEN

Se les eliminaron las hojas a un número de árboles de café después de la cosecha, a seis niveles distintos, a saber: cero por ciento (control), 20, 40,

60, 80 y 100 por ciento. De los resultados obtenidos se determinó una ecuación de regresión linear mostrando que el rendimiento disminuye según aumenta el por ciento de eliminación de las hojas. Al evaluarse un sistema para cosechar café debe tenerse en cuenta el efecto que pueda tener la eliminación de las hojas.