SOME OBSERVATIONS ON SHEAR PLUCKING OF TEA

A. E. Whitham*

Introduction

Shears were used on an experimental basis to harvest tea since November 1965 at Aislaby Estate, Bandarawela (elevation 4000 ft). An experiment was conducted from 15.3.66. on small plots in seedling tea 15 months from pruning. A field trial was also conducted on 70 acres of seedling tea to investigate the feasibility of using shears on a large scale.

Experimental work

Three harvesting treatments were tested *viz*

1 – Hand plucking

2 – Shearing, using shears where the cutting blade and the collecting hopper are at the same level (these shears are referred to as conventional shears)

3 – Shearing, using shears where the collecting hopper is one inch below the level of the cutting blade. (These shears are referred to as modified shears).

Each treatment was applied to two rows of 100 bushes, each plot totalling 200 bushes. There were six replicates, the experimental area covering about one acre. Rounds were every seven days. Individual yield records were maintained for each plot. The time taken to harvest each plot was noted. Coarse leaf was separated and the weights of coarse leaf and flush were recorded separately for each plot. The time taken for separating coarse leaf was noted. The observations are summarized in Tables 1 and 2.

It is seen that harvesting by hand plucking is slower than by either of the shears. On the other hand, the time taken to separate coarse leaf is much greater from shear plucked leaf than from hand picked leaf. When this is taken into consideration it is clear that the use of conventional shears produces an output of leaf which is 3% less per unit time than when hand plucking is done. Also, the use of modified shears produces an output of 6% less per unit time than when hand plucking is done.

When one pound samples of sheared leaf and plucked leaf were sorted out, it was noticed that sheared leaf contained half as much good flush (2 leaves and a bud), twice as many tender damaged leaves and seven times as many hard coarse leaves (or parts of leaves).

In order to investigate whether crop losses due to bud damage may be reduced by alternating shearing and plucking, another experiment was designed with the following treatments :

* Mr. A E. Whitham is the Assistant Superintendent of Aislaby Estate, Bandarawela. The Institute does not necessarily endorse the views expressed in papers contributed by persons other than members of its staff.

TABLE 1—*Effect of 3 types of harvesting on yield*

Treatment	Yield (lb green leaf less coarse leaf per 1200 bushes for 11 harvesting rounds)	% change (Hand plucking=100)	Fresh weight of coarse leaf (lb for 11 harvesting rounds)	% change in coarse leaf weight (Hand plucking=100)
1 — Hand plucking	640	100	1.7	100
2 — Conventional shears	549	85.8	15.4	905
3 — Modified shears	530	82.8	11.2	652

It is seen that both shearing treatments resulted in reduced yields.

TABLE 2—*Effect of 3 types of harvesting on harvesting time*

Treatment	lb green leaf harvested per hour	% change in leaf harvested (Hand plucking=100)	Quantity of leaf separated from coarse leaf per hour	Quantity of leaf separated from coarse leaf per hour (Hand plucking=100)	Output of coarse leaf free Flush per hour (Figures in brackets show % with hand-picking as 100)
1 — Hand plucking	10.5	100	307.2	100	10.2 (100)
2 — Conventional shears	13.3	126	37.6	12.2	9.9 (97)
3 — Modified shears	12.1	105	42.6	13.8	9.6 (94)

1 6 rounds of shearing followed by 6 rounds of plucking, followed by 6 rounds of shearing *etc*

2 3 rounds of shearing followed by 3 rounds of plucking, followed by 3 rounds of shearing *etc*

3 Alternate rounds of plucking and shearing

The results, though yet inconclusive, are shown in Table 3.

TABLE 3—*Effect of periods of shearing and hand plucking on yields*

Treatments	lb green leaf harvested for 14 rounds
1 – 6 rounds shearing alternating with 6 rounds plucking ..	152.8
2 – 3 rounds shearing alternating with 3 rounds plucking ..	152.6
3 – 1 round shearing alternating with 1 round plucking ..	155.5

From Table 3 it is seen that yields do not seem to be altered by any of the treatments.

Discussion and conclusions

The standard of leaf aimed at was the governing factor in these experiments. If a poor standard of leaf is accepted and little or no sorting is carried out, a worker can cover an area in about 30% less time (Table 1), than is possible by plucking to good leaf standards. Sheared leaf that has not been sorted, however, would hardly be acceptable in the average Ceylon tea factory and very poor prices would be realized if the manufacture of this coarse stalky leaf were attempted. On the other hand if leaf were picked over thoroughly in the field and brought to a good standard, there would be no labour saving—one might even show a poorer output as the figures reveal.

The use of modified shears is a little slower than the use of conventional shears.

Although shearing was done on a seven day round, still the coarse leaf obtained from shear plots when weighed showed that shears produced 10 or 15 times more weight of coarse leaves and stalks than plucking. Modified shears were far superior to the conventional model in this respect because a dropped hopper prevents the pluckers cutting too hard and low, but predictably, harvested leaf weight is lower than the flat hoppered conventional shears.

One consistent feature in the experiment has been that plucking has always produced the highest crop. Losses due to shearing can be assessed at about 15%–20% and this reduction in crop is understandable when considering the damage to buds caused by shearing, which results in deformed and smaller flush in subsequent harvests. In one field damaged flush was being produced even six weeks after shearing was suspended during the drought. Furthermore, the shears cannot always take up an entire flush as in the case of plucking and as a result, pluckable leaves or half leaves are left on the bush as lost crop. Some flush is taken prematurely.

The three causes of crop loss which cannot be eliminated are therefore summarized as follows :

1 — Pluckable flush is incompletely harvested and bangis not taken clean

2 — Flush is taken prematurely before optimum size is attained

3 — Damage to unopened buds takes place.

There does not appear to be an adverse effect on the bush after shearing, for size and vigour seem to be well maintained. An occasional clean out of ' bangis ' and ' mudichics ' would of course be necessary — and is a costly process which would again detract from shear performance.

It is apparent that under up-country conditions, where the standard of leaf is critical, shearing does not seem to offer a solution to chronic labour shortages during rush periods, unless one is prepared to suffer low selling prices. Conveyors for sorting coarse leaf over various mesh combinations and blowing out coarse leaf are possible techniques which may circumvent this problem to some extent and would seem to merit further investigation.

The operation of shears on steep land, and on bushes in the latter part of the pruning cycle is difficult and would greatly reduce the speed of the harvesting.

(*Accepted for publication — 1st October 1966*)