

Mechanized Cotton

effects of machine topping and use of defoliant studied

J. R. Tavernetti and H. F. Miller, Jr.

The experiments reported in this article were conducted co-operatively by the University of California Agricultural Experiment Station and the United States Department of Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering.

Topping of cotton, to prevent lodging—falling over—of tall rank growing plants, can be done mechanically but machine topping to too low a height may reduce the yield.

The main difference between hand topping and machine topping besides eliminating labor is that in hand topping only the terminal bud of the main stalk is cut off whereas with machine topping everything including the lateral branches are cut to the height for which the machine is set. In both cases the terminal bud of the main stalk is cut or broken to prevent further growth.

During 1951 and 1952, experiments were conducted at the United States Cotton Field Station at Shafter to determine the effect of hand and machine topping of cotton on lodging, yield and efficiency of mechanical harvesting. In the 1951 experiments topping was done on August 8 when the plants were 4' to 5' in height. In the machine topped plots all growth above a height of 48" was cut off. The results showed no significant difference in yield or picker efficiency between hand and machine topped, and untopped—check—treatments. There was less lodging in the topped plots than the untopped but even the latter plants did not reach enough height to cause much lodging.

In 1952 the topping was done on August 8 also with two sets of plots in the experiment. In one set the cotton was 4' to 5' high and was machine topped to 46". In the other set the plants were about 4' high and were machine topped to 42". The average plant population in the plots was 50,000 per acre. All harvesting was done with a single row barbed spindle type picker.

The results in the experiment where the cotton was machine topped to 46" showed no significant differences in yield between the three treatments but there was a significant difference in picker efficiency and also in lodging. In the check or untopped plots most of the cotton lodged while there was no lodging in any of the topped plots. The lower picker efficiency in the check plots was due to the lodging making picking more difficult. In the experiments where the plants were

Effect of Defoliation on Picker Efficiency and Grade of Mechanically Harvested Cotton—1952

| Treatment | Yield, bales per acre | | Picker efficiency, per cent | Trash, per cent | Grades, 8 samples |
|------------------------------|-----------------------|-------|-----------------------------|-----------------|-------------------|
| | First picking | Total | | | |
| Check—no defoliant | 2.13 | 2.27 | 95.4 | 7.3 | 5-M, 3-SLM+ |
| Herbicidal defoliant | 2.09 | 2.22 | 93.9 | 7.0 | 5-M, 3-SLM+ |
| Regular defoliant | 2.03 | 2.09 | 95.4 | 4.6 | 8-M |

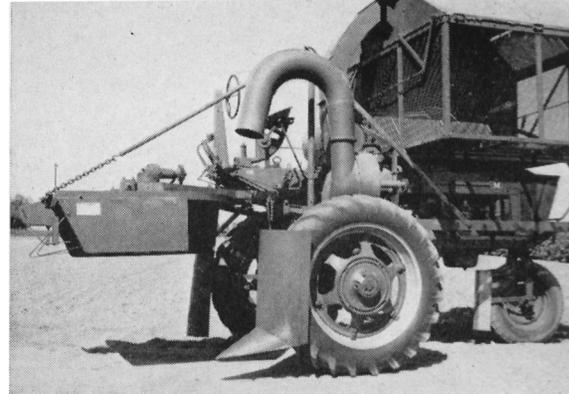
machine topped to 42" there was a decrease in yield in the machine topped plots compared to the check and hand topping. The cotton in this experiment never reached a height sufficient to cause lodging and there was no significant difference in the picking efficiency.

Another experiment conducted during 1952 determined the effect of defoliation on picker efficiency and grade of mechanically harvested cotton.

Three different treatments were used—no defoliation or check, an herbicidal defoliant which killed the leaves but did not cause them to fall from the plant, and a regular defoliant which caused 80% to 90% of the leaves to drop off.

All plots were planted to a stand with the plant population averaging about 50,000 per acre. The cotton plants at time of harvest—October 10—were 3' to 4' in height and standing erect, and the field was practically free of grass and weeds. Harvesting was done with a single row barbed spindle type picker. Samples for grade were taken from the trailer at the time of first picking but were not ginned until a month later which gave green trash time to dry.

The results showed that defoliation had little effect on picking efficiency but did affect trash content and grade. The cotton in the plots where the regular defoliant was used had less trash than that



A two row cotton topper made by mounting a stalk cutter with horizontal revolving blade on a cotton picker from which the picker head has been removed.

1951 Cotton Topping Experiment

| Treatment | Yield, bales per acre | | Picker efficiency, per cent |
|--------------------------|-----------------------|-------|-----------------------------|
| | First picking | Total | |
| Check—untopped | 2.18 | 2.33 | 92.7 |
| Hand topped | 2.22 | 2.33 | 93.3 |
| Machine topped | 2.18 | 2.29 | 93.0 |

1952 Cotton Topping Experiments

| Treatment | Yield, bales per acre | | Picker efficiency, per cent |
|------------------------------|-----------------------|-------|-----------------------------|
| | First picking | Total | |
| Check—untopped | 2.81 | 2.94 | 92.7 |
| Hand topped | 2.92 | 2.97 | 95.5 |
| Machine topped—46" | 2.80 | 2.87 | 95.5 |
| Check—untopped | 3.15 | 3.19 | 95.0 |
| Hand topped | 3.13 | 3.20 | 95.0 |
| Machine topped—42" | 2.94 | 3.00 | 94.7 |

having the other treatments and averaged higher in grade, but slightly less yield. More tests are needed to learn if the reduction was caused by the defoliant.

J. R. Tavernetti is Agricultural Engineer, University of California, Davis.
H. F. Miller, Jr., is Agricultural Engineer, U.S.D.A. Shafter, California.

A high clearance spray rig used for applying defoliant in the experimental plots.

