California AGRICULTURE

Progress Reports of Agricultural Research, published by the University of California College of Agriculture, Agricultural Experiment Station

Vol. 1 AUGUST, 1947 No. 9

Storage, Shipping And Precooling Of Stone Fruits

F. W. Allen

The ability to hold stone fruits for even a week or ten days makes it possible for the canner or processor at the peak of the harvest season to receive fruit faster than it can be processed.

Most stone fruits will, even under best storage conditions, soon show some deterioration, with the amount and rapidity depending largely on the condition of the fruit when received.

Storage Temperature

The storage temperature and humidity generally recommended for peaches, apricots, plums and cherries is 31° to 32°F, with a humidity of 80-85%.

After a number of weeks in experimental storage at 32° the flesh of well matured peaches frequently becomes red, but at 31° or 30° it either remained normal or else reddening was materially retarded.

It has been reported that where freezing did not occur, peaches stored at 30° and ripened at 70° were often of distinctly better quality than those stored at 32°.

With all stone fruits, unless it be cherries, storage temperatures between 35° and 42° for any length of time have proven unsuitable.

One of the first signs of deterioration in peaches, nectarines and apricots is loss of flavor—followed perhaps by a discoloration of the flesh. This loss of flavor may be noticeable even after a period of ten days.

Peaches

In some of our experimental lots of peaches, fair quality still existed after a storage period of four weeks at 31° but browning of the flesh occurred very soon after the fruit became ripe. After holding for six weeks in storage all samples, even though of good external appearance, were worthless.

Apricots

Well matured apricots in a few instances have been held with fine appearance for eight weeks. Observations however, on approximately 200 samples showed that the flavor had generally deteriorated and that 12% developed some browning around the pit during four weeks in storage. Little difference was noted in this respect between samples held at 30°

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Comparative Tests On Plowed And Unplowed Soil For Sugar Beet Seed-bed Preparation

L. D. Doneen

Results of trials over a period of four years show that nothing is gained in the production of sugar beets by plowing the soil in seed-bed preparation provided shallow cultivation kills all the weed growth.

In this study, plowed and unplowed plots proved to be substantially the same in yield, sugar content, purity, and number of beets per acre; the volume weight and pore space of the soil; penetration rates of the irrigation water; and the shape of the beets.

If weeds infest the surface soil, plowing may be practical for burying their seed deeply and thus eliminating some of the weed growth the next year.

Under certain other conditions, such as where a plow pan exists, deep tillage or plowing may be necessary. Plow pans interfere with the penetration of irrigation water and sometimes cause rotting of the beet root. They should be broken by deep tillage or deeper plowing.

Even though these exceptions exist, plowing could be eliminated profitably on much of the sugar beet land in California.

Preparation of the Seed-Bed

The experiments consisted of two treatments; (1) The soil was not plowed, but was stirred to the depth of two to four inches with a springtooth harrow or disk to kill all growing weeds before the crop was planted. (2) The soil was plowed 12 inches deep in the late fall or winter.

The sugar beets were planted the latter part of January or in February, according to weather conditions. Except for keeping cultivations to a minimum for weed control, the cultural operations after planting were the same as those practiced in the area adjoining the experimental plots.

Yield of Beets and Sugar

The difference in mean yield for the treatments, 0.44 tons of sugar beets, was not statistically significant.

The difference in per cent sugar was slight between the plowed and unplowed plots. The average for the two treatments showed 0.33% higher sugar in the beets for the unplowed than for the plowed plots.

The purity of the beets was about the same for both treatments. The average gross sugar per acre was essentially the same.

Drying and Crusting

When there were conditions favorable for rapid drying of the soil, it was observed throughout these experiments that the surface soil dried earlier in the plowed plots. In the areas not plowed it showed higher moisture for several days.

In areas where crusting of the soil is a problem, the moist surface of the shallow-tilled soil provided a period several days longer for the emergence of the seeding before crusting occurred. On the unplowed soil, the crusting was usually less severe than on the finely pulverized plowed soils.

Germination of the Seed

In the unplowed areas, the seed ball was placed on a firm and compact soil, which may have given better germination. The time for seedling emergence on the unplowed land was two to four days less than on the plowed.

Even though the plowed land had been harrowed and rolled, there was a tendency to deeper planting because the soil was so loose.

Growth of Roots Above the Surface

A study was made to determine whether a firm soil, as in the unplowed plots, would cause more of the beet root to grow above ground than in plots plowed 12 inches deep.

The results indicated that the fleshy part of the beet root was not forced to grow above the unstirred portion of the soil.

Specific Gravity of the Soil

Investigations were made of apparent specific gravities of the soil of these two treatments.

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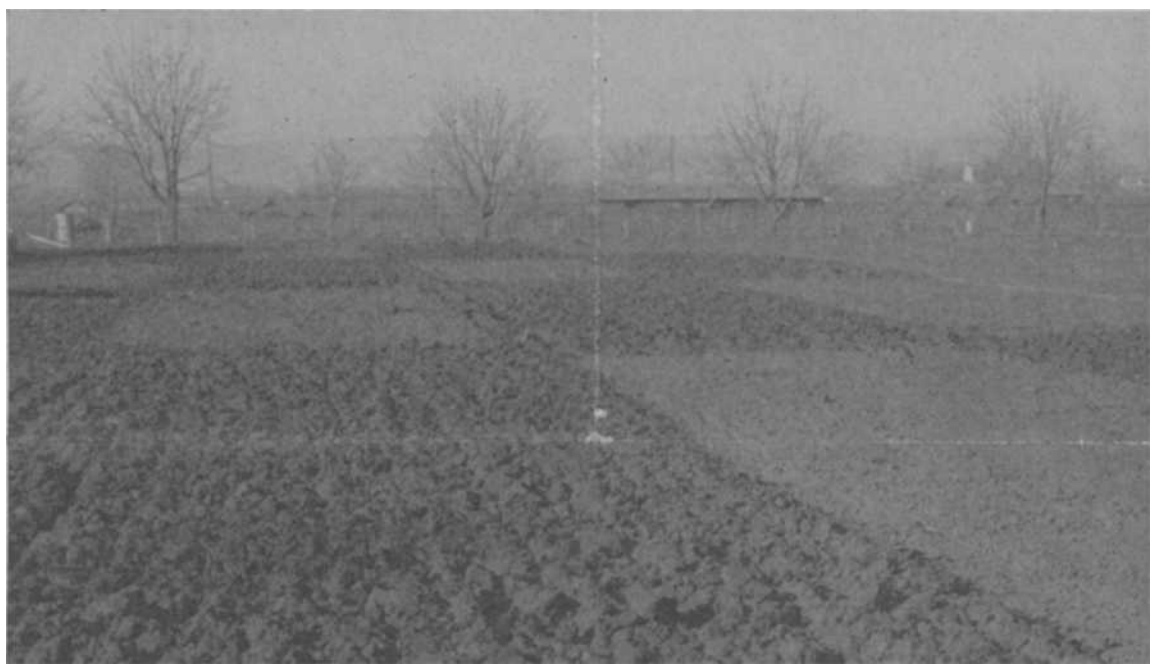

Partial view of the plowed and unplowed plots in the seed-bed preparation experiment. The rough land indicates the plowed plots, later cultivated to finely pulverized seed-bed. The light areas indicate the unplowed plots, which have been disked about two inches deep, floated, and made ready for seeding the crop.

Fertilized Legumes Aid Following Crop Of Non-legumes

John P. Conrad

Fertilizers containing no nitrogen may increase the growth of legumes such as bur clover, vetch, and peas, which contain relatively high amounts of nitrogen. This is possible because bacteria contained in nodules on the roots of legumes fix the free nitrogen of the air—a form unavailable to most other plants.

The increased amounts of fixed nitrogen supplied by the decay of the residues of these fertilized legumes may give greater yield to the following crops of non-legumes.

Until recently the possible magnitudes of the increases in yields of legumes and of the following season's non-legumes for many agricultural conditions in California had not been recognized. Nor had the particular fertilizer or combination of fertilizers nor the legumes best suited to give increased growth of the following non-legumes for each locality been determined.

Observations in one area of Ventura County a few years ago indicated that carriers of sulfur markedly increased the growth of bur clover, and that this increased legume growth more than doubled the yields of the following barely crop, gave some idea of the magnitudes of the increases possible.

Field Trials

As sulfur alone could not be expected to give maximum yields of legumes in every location throughout the state, about 150 exploratory trials to determine local deficiencies by the response obtained, were established in 20 representative counties.

In general at each location, treble superphosphate supplying phosphorus, muriate of potash— potassium chloride—supplying potassium and gypsum supplying sulfur were applied singly and in all combinations.

About 50 good—50%—to marked —200% to 1000%—increases in the growth of legumes, principally bur clover and vetch, on range, hay, grain, and pasture lands have already been secured. Of these increases about 40% have been from gypsum alone, about 40% from treble superphosphate alone, and about 20% from a combination of the two. The possibilities of additional responses from potash seem promising in some areas but further detailed

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Costs Of Methods Of Mechanized Harvesting Of Alfalfa Hay Are Subjects Of Comparative Study

Arthur Shultis

To compare methods and costs of harvesting alfalfa hay in California a survey was conducted by the Bureau of Agriculture Economics in 1945.

In California, over 100 records were collected on alfalfa hay harvesting in Madera County, where most methods used in the Central Valley were available for study.

Mowing and Raking

There were 30 horse-drawn and 79 tractor mowers in the study.

The total cost per acre for mowing with a 5-foot horse-drawn mower, averaged $1.39.

The average total cost of tractor-drawn 6-foot mowers was 72c per acre.

Where 7-foot tractor-drawn mowers were used, the total average cost per acre was 71c.

In cases of horse-drawn dump-rakes the total cost per acre averaged 71c also.

The cost of the 10-foot tractor-drawn side-delivery rake, averaged 70c per acre.

Loose Hay

Transportation of loose hay from windrow to storage was studied in cases of pitching on and off, pitching on and unloading mechanically, and the use of a hay loader in the field with mechanical unloading at storage.

In cases where horse-drawn wagons were used with the pitch on and off, the output averaged 0.7 tons per hour at a total cost of $4.44 per ton. Where the wagons were tractor-drawn the output was 0.9 tons per hour at a total cost of $4.35.

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Control Of Vapors In Storage Essential For Prolonging Life Of Avocados And Citrus Fruits

J. B. Biale

Improved keeping quality and longer storage life were the aims of extensive studies conducted during the past seven years on storage problems of avocado and citrus fruits.

It was found that respiration measurements afforded an objective criterion for determining the effects of various treatments. These measurements consisted of finding out by suitable chemical methods the amount of oxygen absorbed and carbon dioxide given off by the fruit.

Respiration and Ripening

The relationship between respiration and ripening is most striking in the case of the avocado.

When a sample of fruit is placed at a constant temperature and under a constant rate of ventilation, the rate of carbon dioxide evolution first drops to a minimum, then increases sharply to a maximum, followed by a marked decrease in respiratory activity.

Fruit softening was found to be closely associated with this trend in respiration. It never occurred prior to the peak but always following it. From the nature of the carbon dioxide curve, predictions could be made as to the date when avocados would be most suitable for consumption.

To prolong storage life, different treatments were employed which would delay the rise in respiratory activity. Reductions in the oxygen content of the atmosphere and increase in carbon dioxide concentration resulted in doubling and tripling the storage life of Fuerte avocados.

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Satisfactory Control Of Wild Morning-glory By Use Of 2,4-D Requires Proper Application

W. A. Harvey and W. W. Robbins

An extract from the College of Agriculture Agricultural Extension Service Circular 133, "2,4-D As A Weed Killer." Revised June, 1947

Wild morning-glory is highly susceptible to 2,4-D.

The top growth and most of the vertical roots are killed by proper application. Ordinarily, some laterals survive, and shoots not up at the time of spraying may later emerge unharmed.

Satisfactory control will result only when attention is given to the various factors affecting susceptibility. Treatment of old plants in dry areas, particularly following cultivation, has given poor control.

Dry-farmed Grain Land

Morning-glory may be effectively controlled on grain land in two ways.

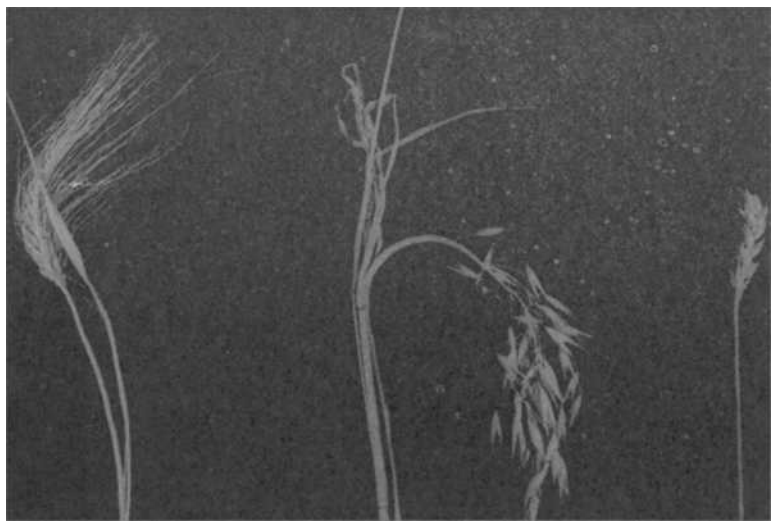
Selectivity

Because of the high susceptibility of morning-glory to 2,4-D, the selective control of this weed is often possible.

In strawberry plantings it has been effectively controlled without injury to the crop. If the strawberry plants are blooming at the time of spraying, the next crop of berries will usually be lost because the spray affects the blossoms. Little is known about the way in which different varieties of strawberries react to 2,4-D.

Precautions

In general, broad-leaved plants are relatively susceptible to 2,4-D, but there are exceptions. For example, it is usually easier to effect a permanent kill of broad-leaved annuals than of perennials. However, since no plants are completely resistant, the chemical must be used carefully.



Injury to barley, oats and wheat from 2,4-D. Not more than three-quarters of a pound of 2,4-D acid per acre should be used when spraying for control of morning-glory in growing grain.

In the fall of the year previous to fallowing, the ground should be plowed or cultivated. In the fallow year, the morning-glory should be sprayed in the early summer when most of the plants have emerged, usually at about the time they begin to blossom. If there is sufficient soil moisture to allow new plants to develop normally, a second spray the same year may be applied. Often the soil is too dry to permit a successful second spray the same season. A rate of 1½ pound of 2,4-D acid per acre is recommended.

The second method of handling morning-glory on grain land is to spray it in the growing grain. Again, the land should be prepared in the fall and seeded, following a light disking, in the spring. Morning-glory should be big enough to spray before the grain is too tall. Plots on the University Farm at Davis were treated in this way in 1945. The grain is still relatively free from morning-glory and yields have been increased. In grain, not more than three-quarters of a pound of 2,4-D acid should be used.

Neither of these methods alone will result in eradication since some lateral roots usually survive from which new shoots emerge after treatment. New plants also grow from seed already in the soil. However, because of the low cost of the chemical, the control achieved is definitely profitable.

The regular use of 2,4-D on grain land as a control measure seems desirable, with eradication as a long-time objective.

Grain fields on which morning-glory has gone to seed for a number of years usually have enough seed in the soil to reinfest the area for many years.

Eradication on such areas is not possible with a single treatment of any chemical, but economic control is definitely feasible.

Irrigated Lands

On either surface or subirrigated land, morning-glory may be brought into a proper condition to spray more easily than on dry land.

A fall treatment is often possible following irrigation, but midsummer treatments, even on irrigated land, have not been very successful.

A minimum of soil disturbance is advisable in order to get uniform emergence.

Morning-glory may be treated in corn or milo after the crops are well established but before they cover the rows.

Soil sterilization may result from use of 2,4-D. How long the effects will remain depends upon amount of chemical used, temperature, rainfall or irrigation, soil type, and crop planted. While grains and grasses apparently suffer no damage if planted within a few weeks after spraying, beans, peas, lettuce, tomatoes, cabbage, broccoli, sugar beets, alfalfa and many other crops are extremely sensitive to small quantities of the chemical.

A sprayer or any other equipment which has contained 2,4-D must be thoroughly washed before it is used for other material. Otherwise, field, orchard, and ornamental plants may be damaged if even a small amount remains in the sprayer. One cold-water rinse is not sufficient. Use several changes of water—preferably warm—to which a little baking soda or washing soda has been added. Where an ester formulation has been used, preliminary washing with kerosene would be desirable.

When spraying a lawn or other area, never allow the spray to reach nearby ornamental or crop plants. Even small amounts of drift will injure these plants, some of which are highly sensitive.

Recently, grapevines from the San Joaquin Valley have shown what appeared to be damage from 2,4-D after treatment of morning-glory in the vineyard. The effects on the vines may have been due to drifting of spray, to action through soil, or both.

Experience with 2,4-D in vineyards is not extensive enough, either to encourage or discourage its use of weed control in such plantings.

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Agricultural Extension Circular 133, "2,4-D As A Weed Killer" may be secured without charge by addressing a request to: University of California College of Agriculture, Berkeley 4, California.

Underground Water Supply During Low Rainfall Seasons

C. N. Johnston

Seasons of low rainfall are generally periods accompanied by a high use of underground water by pumping, and that supply of water is apt to be short, too.

In years of subnormal rainfall the streams carry less water than usual during the flood periods, and may not flood at all. They dry up earlier in the spring or summer. Surface flow ceases earlier than in wetter years.

When enough water is not provided by rainfall, for the growing of crops, some supplemental water must be provided.

One source of supplemental water is the underground supply obtained by the use of wells and pumping.

Movement of Underground Water

Underground water is the by-product of seepage or percolation of the seasonal rainfall into the subsoil strata, either directly or from streambeds and the like.

Because it is the by-product of seepage from surface water, the underground supply is often short when the seasonal rainfall is below normal.

Like any surface stream, most underground waters are moving from their sources downward through gravels or sands toward some locality of escape.

When wells are drilled to water-bearing gravels or sands, they provide an open contact with such water as may be found there.

If the tapped flow of water can not pass the well freely, because of some obstruction beyond the well, pressure exists in the stratum at the location of the well. Under these conditions, the water from the stratum move into and upward in the well until a column of water stands in the well at a pressure equal to that of the water in the stratum.

The depth to water, from the surface of the ground to the standing water surface—the depth to static water—is easily measured.

Result of Lowered Water Level

During a period of low rainfall, less than the normal amount of water percolates into the water-conducting gravel or stratum. At the same time, the escape area for the underground stream is still functioning.

A 2-stage 12-inch turbine pump on a 12-inch well with a 55-ft. lift and a 20-ft. drawdown, to discharge 920 gallons a minute. Well is in Yolo County.

The pressure, initially due to maintained inflow, becomes less and the water column in the well is not held at the same high level as formerly. It is said that the static water level has dropped.

Drawdown

When a pump is put in a well and is operated, water is removed. This means water within the stratum can move into the well to replace the discharged water. It can not move into the well without moving downward, so the water level in the well, during pumping, stands at an elevation lower than the static level. This drop in elevation is the drawdown of the well caused by the removal of the quantity of water pumped to the surface.

When many deep well pumps operate in an area, they cause the water to flow into the area faster than formerly. They produce a local drawdown of static water levels in nearby unpumped wells.

During years of short water supply the underground flow is reduced at the source. At the same time, pumps work longer to make up the rainfall deficiency for the crops. As a result, static water levels and pumping water levels drop markedly.

Deep Well Pumps

The characteristic of deep well pumps of the turbine or centrifugal type, is such that any increase in pumping lift causes a reduction in the discharge rate. The reaction of all such pumps to lowered water table conditions is a reduced flow for irrigation.

A reduction in discharge rate means the pumps will have to run longer than originally to deliver the same volume of water.

Dropping Water Levels

If the water levels recede very much, the pumps actually begin to lose suction. The pump can not operate effectively and in extreme cases, not at all, when the water level drops severely.

The owner quickly observes these symptoms and his only recourse is to lower the pump by inserting standard sections supplied by the manufacturers. Lowering the pump will permit the continuation of pumping in these severe conditions.

The pump must lift the water an abnormal distance, with lowered water table conditions, and will continue to deliver at a reduced rate of flow regardless of the fact that it has been placed at a lower level in the well.

When normal water levels return, the pump will regain its original discharge rate.

If well water levels can not be expected to return to normal, as is the cases in some areas, and one desires to have the original discharge rate for his pump again, a simple economical solution unfortunately is not usually available. A complete new pump and motor may be the only answer in some extreme cases.

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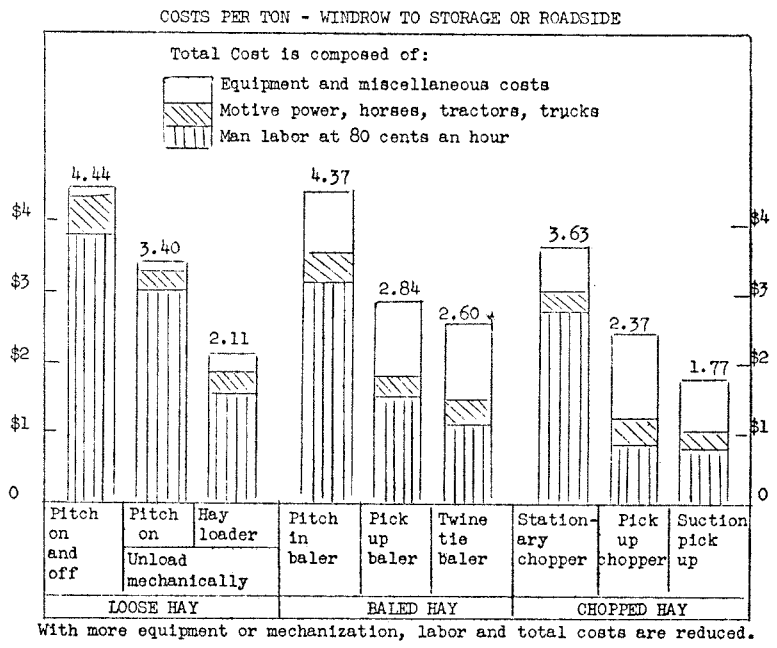
The problems of the cling peach industry are being studied intensively by the Division of Pomology.

Costs Of Methods Of Mechanized Harvesting Of Alfalfa Hay Are Subjects Of Comparative Study

(Continued from page 1)

When the pitch on and mechanical unloading method was used with horse-drawn wagons, the output averaged 1.2 tons per hour at a cost of $3.40 per ton. With tractor-drawn wagons the cost of 1.3 tons per hour was $3.74 per ton.

Where the hay loader was used in the field and the unloading at storage was done mechanically—regardless of the wagon-power—the output was 1.6 tons per hour and the cost was $2.11 per ton.



With more equipment or mechanization, labor and total costs are reduced.

Baled Hay

The pitch-in horse-drawn balers studied, averaged 2.2 tons output per hour at a cost of $3.29 plus $1.08 haul-out to roadside cost, making a total of $4.37 per ton, roadside. The output remained the same—2.2 tons per hour — with tractor-drawn balers, while the cost rose to $3.71 per ton, plus the $1.08, making a total of $4.79, roadside.

The most common present method of baling hay is that using a two or three wire-pick-up baler in combination with tractor mower, tractor side-delivery rake, and bale loader.

In this study the two-wire pick-up baler, which makes an 80 to 90 pound bale, averaged 3.7 tons output per hour at a cost of $1.98 plus an 89c haul-out cost, to total $3.87 per ton, roadside.

The three-wire pick-up baler produced bales between 120 and 130 pounds and averaged 3.8 tons output per hour at a $1.98 per ton cost, plus 80c for haul-out, to make a total of $2.78 per ton, roadside.

The automatic twine-tie baler produces bales weighing between 60 and 85 pounds. In this study this baler averaged 3.4 tons per hour output at $1.74 per ton, with an 86c haul-out cost, making a total cost of $2.60 per ton, roadside.

The great saving in man labor resulted in the automatic twine-tie baler being the most economical baling method in the survey.

Chopped Hay

Where loose hay was pitched on horse-drawn wagons in the field and transported to a stationary chopper where it was unloaded by hand, the output was 1.4 tons per hour. The cost of this method was $3.63 per ton.

The use of a hay loader and tractor-drawn wagons in the above operaton cut the output to 1.1 tons per hour but also cut the cost per ton to $2.95.

Suction hay loaders, picking up the hay from windrows and cutting it up sufficiently for mechanical feeding to a stationary chopper, increased the output to 5.6 tons per hour at a cost of only $1.77 per ton.

The pick-up field chopper which picks up the hay from the windrow, chops it, and blows it into a wagon or van for transportation to storage, averaged three tons per hour at a cost of $2.37 per ton.

The actual costs disclosed by the survey reported here offer certain conclusions applicable under any set of wage, tractor, and equipment costs. Increased mechanization does result in lower labor and total costs, even though higher equipment costs are included.

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CALIFORNIA AGRICULTURE

Established December 1946

Progress Reports of Agricultural Research, published monthly by the University of California College of Agriculture, Agricultural Experiment Station.

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