California AGRICULTURE

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The Agricultural Situation And The Outlook In Mid-'47

H. R. Wellman

Condensed from an address delivered before the California State Association of County Assessors, Sept. 2, 1947, San Francisco, California.

The outstanding fact in the present agricultural situation is the current high level of farm incomes.

Up to 1945, net farm income in California increased more rapidly than in the country as a whole. Over the past two years production expenses of California farmers have risen about as much as cash receipts from farm marketings.

During the first four months of this year cash receipts from farm marketings in California were nine per cent larger than in the corresponding period of 1946. This gain occurred in livestock and livestock products; cash receipts from crops were slightly below last year.

Among the major classes of agricultural products, fruits alone are bringing less money this year than last. But fruits are a very important component of California's agriculture, much more so than in the rest of the country. In 1946, for example, 35% of California's cash receipts from farm marketings came from fruits; in all other states combined only four per cent came from fruits.

In March of this year the index of prices received by farmers in the United States reached a new high record, 20% above the 1946 average and 125% above the 1941 average.

Prices Result of Demand

The explanation of high farm prices is to be found in the demand situation.

Domestic demand is exceptionally strong with national income and employment at record high levels. Foreign countries are eager for our exportable surpluses.

The 1947 farm output in this country is large and is bringing high prices. Thus far in 1947, national cash receipts from farm marketings have run well ahead of those of 1946.

Farmers are in an excellent financial position; in the aggregate they have reduced their debts substantially since 1940, and in addition have accumulated large liquid assets.

The Outlook

Despite the current highly favorable situation farmers are somewhat apprehensive as to the future.

This apprehension stems in part

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Pre-emergence Spray For Weed Control In Sugar Beets Seeded In Undisturbed Soil Successful

W. W. Robbins and Roy Bainer

Preliminary field tests on the University Farm, Davis, indicate that pre-emergence spraying offers promise as one method of controlling weeds in sugar beets. The method may be applicable to other row crops.

The field tests were as follows: In December the field was disked and floated; a portion of the area was left flat, the remainder ridged and formed into beds; the field was left in this condition throughout the winter; seedings to sugar beets were made on February 24 and March 12.

At the time of seeding there was a good growth of various winter weeds, mostly in the seedling stage.

Decorticated sugar beet seed was drilled in at three different depths: 1 inch, 1½ inches, and 2 inches. A precision drill was used, the seeding rates ranging from four to five pounds per acre.

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Control of weeds in sugar beets by the use of pre-emergence sprays. A. Normal weed growth at the time of spraying. B. Adjacent soil after spraying. Beet seedlings appeared in these plots within five to six days after spraying. C. The strip of weedy growth in the middle was unsprayed while the soil on either side was sprayed. D. The plot in the right foreground was sprayed, the surrounding soil was not sprayed. Plots C and D were neither cultivated nor irrigated. The photographs of these two plots were taken about 45 days after spraying.

Bulk Handling of Milk By The Ranch To Factory System

E. L. Jack and R. L. Perry

Milk-holding tanks on dairy farms, used in conjunction with tank trucks, are bringing about savings to the dairyman and to the milk buyer through the elimination of the ten-gallon milk can.

Traditionally, milk on the farm is run over a cooler to bring the temperature down below 50°F. It goes from the cooler directly into a ten-gallon can where it is held in a cold room until hauled to the milk plant.

In this new method the milk goes into a large storage tank on the farm instead of into the cans. It is pumped from the storage tank into a tank truck and hauled to the milk plant.

This bulk-handling method saves a considerable tonnage in hauling; does away with handling the cans on the ranch, on the truck and in the plant; recovers more milk than is possible in cans; and does away with can washing.

Direct Benefits to Dairyman

Some of these savings benefit the dairyman directly. He does not have to have someone attend the cooler during milking to fill the cans and put them in the cold room. On larger dairies this one feature alone may save the expense of one man.

The dairyman also gains directly in the amount of milk for which he is paid. Under the tank system he is paid for all the milk that is in the tank when the truck arrives. It is measured there directly. Under the can system he is paid only for the amount of milk that drains from the cans at the milk plant receiving platform. Approximately one-eighth of a pint remains in each can and therefore is not weighed. This additional recovery of milk is estimated by one firm to increase the annual receipts of a dairyman shipping twenty cans per day by 750 pounds a year.

There is also a great savings in hauling. A ten-gallon milk can which holds 86 pounds of milk weighs in the neighborhood of 25 pounds when empty. This means that approximately one-fifth of the total load of milk in cans comprises container weight, rather than milk weight. At prevailing rates milk is hauled in tank trucks from ranch to factory from one-half to six-tenths of a cent per gallon cheaper than in ten-gal-

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Citrus Orchard Cost Study And Analysis Made In Orange County Over 21-Year Period Is Reported

Harold E. Wahlberg

Over one hundred citrus growers in Orange County have cooperated with the Agricultural Extension Service for the past 21 years in a cost study and analysis of orchard management.

The growers furnished detailed cost reports on their orchard operations. The reports were summarized and divided into two groups—the higher return orchards and the lower return orchards. An average was struck for the entire study. A wide range of costs was reported in most items.

Fertilization

Fertilization is an example of the wide range of operational costs.

In 1946, one grower reported a fertilizing cost of $137.18 per acre. Another grower spent only $7.16 per acre. The best 20 orchards averaged $41.03 per acre and the average of all orchards was $53.65 per acre.

In most years the orchards with the highest fertilizing costs were not the top orchards. The extra dollars spent, often for the more expensive mixes, did not justify the added expense.

It appears from these studies that about three pounds of nitrogen per mature tree, in normal thrift, is optimum. Very large trees may use four to five pounds.

Last year, three pounds of nitrogen per tree at 80 trees per acre, cost

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Control Measures In Trichomoniasis Abortion By Cows

H. S. Cameron

Abortion and sterility constitute major sources of loss to the dairy cattle producer.

Infection is probably responsible for the greater portion of these losses, and brucellosis is, by far, the leading offender in the classification.

Bovine trichomoniasis should be considered as next in importance, because serious losses can result when the infection gets into a herd and is allowed to persist.

Unlike an abortion storm from brucellosis the onset is very gradual, the first thing noticed being an unusual number of cows, assumed with calf, returning to heat.

Bull is Carrier

The disease is transmitted only by

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Water Infiltration Rates Into Yolo Loam Studied To Determine Irrigation Efficiency Factors

Arthur F. Pillsbury

Water infiltration rates into Yolo loam during irrigation were measured in 96 basins in a series of experiments conducted in Los Angeles County over a period of five years.

Several different treatments were carried on, permitting the isolating of a number of factors which influence the rate of water entry into the soil.

Organic Matter

Organic matter is known to improve soil structure and infiltration rates, but the belief often prevails that to do so it must be incorporated into the soil.

Applications of straw or other crop residue as a mulch were found to be at least as valuable on the surface as when incorporated in the soil—provided they were kept relatively moist so as to decay rapidly. Normally, there was insufficient decay through the summer to cause appreciable infiltration rate increases.

After a mulch had been in place for a while during the winter, increases in the rates of water infiltration were up to seven times greater than the rates in those plots without mulch.

Benefits from organic matter are largely from the products of the rotting mulch which are carried into the soil by the water.

Shade

Since organic matter mulch shades

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Spraying Liquid Insecticides From Air Lessens Drift

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The by-passed liquid also serves for agitating the material in the storage tank.

A clutch is provided on the power take-off drive so the plane's full engine power can be utilized in lifting it from the ground.

Droplet Size

Some materials such as selective weed sprays seem to be more effective when applied as coarse sprays. This is fortunate because the drift problem is much less critical with the larger droplet sizes in the range of 300 to 500 microns.

Insecticides, in general, give a more uniform and effective deposit when atomized to smaller droplet size, probably in the range of 50 to 300 microns.

The degree of atomization by the boom-with-nozzles type of disperser may be changed greatly by the location of the nozzles on the boom. For example, with nozzles discharging downward and at 90 degrees to the air flow, the liquid is broken up much finer than when the nozzles are directed to discharge backward with the air flow.

Seeding and Weeding by Plane

The airplane has been used successfully for seeding thousands of acres of rice, barley and legumes.

Herbicides have been applied successfully by plane on grain field, rice fields, alfalfa, and on irrigation and drainage ditches.

Even the broadcasting of fertilizer by plane has been done extensively and successfully.

These diverse agricultural applications for the airplane make is possible for the commercial operators to use their equipment over a greater portion of the year and as a result, lead to better equipment and less cost to the grower.

O. C. French, assistant Professor of Agricultural Engineering and Assistant Agricultural Engineer in the Experiment Station, Davis, resigned Sept. 1, 1947.

Control Measures In Trichomoniasis Abortion By Cows

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the bull when breeding a cow. The organism — trichomonad — causing the disease lives deep in the sheath of the bull and does not affect the semen.

The cow may conceive normally from the service, but if trichomonads are also introduced into the uterus with the semen, ideal conditions are created for their multiplication with the result that the developing fetus is eventually killed by the trichomonads. This can occur any time after conception and may result in an abortion too small to be observed.

Spread of the Disease

A cow may come in heat in two or three days after an early abortion, and be rebred, perhaps to a different bull, with the result that the second bull may become infected, The vagina of the cow is likely to harbor numerous trichomonads for several days following abortion.

The first symptom in the herd is the return to heat of a number of cows, assumed to be with calf, because of having shown no heat following breeding two or three months previously.

Being an infectious and venereal disease a considerable number of cows are likely to be involved, and the majority of them traced to service by a particular bull. Vaginal discharge, whitish in color, from cows supposedly with calf is also observed.

When an abortion is seen it is usually during the first half of gestation and the fetus shows evidence of having been dead in the uterus for some time. In some cases there is little but skin and bone accompanied by considerable brownish colored fluid.

Diagnosis Difficult

Diagnosis is difficult and can best be made from the breeding records of the herd. A positive diagnosis consists of finding the organisms in fresh discharge following abortion. This is not always possible since trichomonads die rapidly on leaving the pregnant uterus.

The possibility of this infection getting into the herd is one of the reasons for maintaining good breeding records including a record of the performance of each bull in the herd. A bull infected with trichomonads will show a very poor record; over a period of one hundred services he may show as few as six normal calvings.

A tentative diagnosis may be made from breeding records, and control measures adopted immediately because these measures are such that they constitute, today, good dairy management.

Condemned Practice

The infection is usually introduced into the herd through the purchase of a herd sire that has been used elsewhere. Since diagnosis is difficult in the male there is danger that the infection may become widespread throughout the herd unless curbed. Unfortunately, it has been customary to breed a cow to a different bull if she fails to conceive from the first. This practice should be abandoned, it leads to spread of infection to other bulls.

Slaughter of Bull

When infection is suspected or found in a herd, the infected bull should be slaughtered. There is no reliable cure. The infected bull can be determined from breeding records. Infected cows will recover following abortion; that is, the organism will disappear from the genital tract within a few weeks.

Recommendations

A bull should be assigned to a group of cows. If a cow fails to conceive she should be bred back to the same bull unless, in the meantime, the bull has been proved of no value as a breeder, in which case, two heat periods should be missed and the cow bred to another bull on the third. This will allow time for the elimination of any infection acquired from the service by the first bull.

Adherence to this practice at all times is good herd management and if infection of this type gets into the herd, it will be confined to one group only.

H. S. Cameron is Professor of Veterinary Science and Veterinarian in the Experiment Station, Davis.

Treating Row Crop Seeds With Fungicides As Control Measure Against Decay Or Damping-off

L. D. Leach

Treating seeds of several vegetable or field crops with the proper fungicides may improve stands by reducing the amount of seed decay or damping-off. In addition, several seed-borne diseases can be controlled by seed treatment.

To be satisfactory the chemical must be non-injurious to the germinating seed but toxic to the organisms that cause seedling infection. For this reason the treatments used upon various crops differ considerably.

Lima Beans

Lima beans are quite susceptible to seed decay when planted in cool, moist soil but prior to 1940 practically no seeds were treated because the fungicides then available caused severe injury to germinating seeds. About that time new fungicides, safe upon lima beans, were introduced and by 1945 over 75,000 acres of large lima beans, or 75% of the total acreage in California was planted with treated seed in the five southern coastal counties of Santa Barbara, Ventura, Los Angeles, Orange and San Diego.

Control of damping off of sugar beets by seed treatment. The sixteen rows to the right of the center were planted with nontreated seed, while the rows to the left and the extreme right were planted with treated seed.

Other Row Crops

Some crops such as radish, carrot, celery, onion and lettuce are not particularly susceptible to damping off and usually are planted without protective seed treatments. Other crops including spinach, sugar beets, melons, cantaloupe, and peas are frequently subject to seedling diseases and often show considerable benefit from proper seed treatment.

High temperature crops such as beans, melons and cotton are most apt to suffer from seed decay when they are planted in cold moist soils because under these conditions the soil fungi that rot the seeds grow relatively faster than the seedlings. At high temperatures, on the other hand, these same crops may entirely escape seedling infection.

Low temperature crops like spinach and peas are more subject to seed decay or damping off at moderate than at low temperatures providing soil moisture conditions are similar.

Sugar Beets

Sugar beets present a special problem because in addition to being quite susceptible to seedling infection by several soil-borne fungi, some seed lots carry spores of a fungus that causes damping off in cool moist soils. It has been found that dusting the seed with organic mercury compounds gave effective control of these diseases but storage of such treated seed for prolonged periods resulted in seed injury.

Recently two new organic compounds were introduced commercially that gave reasonably good protection and avoided storage injury. In a dust form, however, both proved to be irritating to operators and a modification of the method of application appeared desirable.

Methods of Mixing

Most seed treatments are applied as dusts by mixing the seed and fungicide in commercial continuous-flow seed treaters or by mixing measured batches in diagonal barrel treaters or in cement mixers.

To eliminate the dustiness of treated seeds and to increase adherence one of the commerical companies recently developed a process for applying the fungicide in a moist, pastelike mixture by the so-called "slurry method." This method proved satisfactory upon corn and is being tested on other types of seed.

Other methods of applying concentrated suspensions by spraying the material over the seed during agitation are also being investigated.

Fungicides Available

Nearly all fungicides used for seed treatment have been developed and are offered for sale by commercial chemical companies. The chief function of a special series of fungicidal experiments has been to evaluate these materials with regard to the tolerance of different seeds to specific fungicides and to the protective effects of the fungicides against specific pathogenic organisms.

On the basis of safety and efficiency as well as cost, availability and ease of application the producers are enabled to decide which materials are most suitable for their purposes.

L. D. Leach is Professor of Plant Pathology and Plant Pathologist in the Experiment Station, Davis.

Improved Flavor–Color Produced In Evaporated Milk

N. P. Tarassuk

There is no known effective method of preventing the cooked or caramelized flavor and brown discoloration of milk processed at high temperatures to render it sterile.

Experiments involving a 5% lactose solution containing phosphate buffer revealed the manner in which heating and storage can effect the discoloration. Slight differences in color were intensified when a lactose solution was sealed in a container with different gases in the free space.

Chemical Changes

The chemical changes in the milk which are brought about are an uptake of oxygen, and the production of carbon dioxide by at least one constituent in the milk which is heat-labile—altered by the application of heat.

The decrease in oxygen would account for only a small part of the increase in the percentage of carbon dioxide. The increase in carbon dioxide, in the free space of the container, can not be the result of heat on the carbon dioxide soluble in the milk.

Solubilities of Gases

The solubilities of carbon dioxide and oxygen vary as the partial pressures of the gases change in the free space in the can.

After milk has been heated it will contain more dissolved carbon dioxide and less oxygen. The reaction which produces the browning discoloration releases carbon dioxide and uses oxygen, as shown by an analysis of the gas in the free space.

Ratio of the Gases

Evidenced by the changes of the gases in the free space in the can, the ratio of carbon dioxide produced, to the oxygen used, averaged 0.12 when evaporated milk was sterilized at 244°F for 15 minutes. When the same milk was heated at 168°F for five minutes, the ratio was only 0.09%. Apparently this ratio is much closer to a unity than indicated by the data on the gases in the free space.

When pure moist lactose was discolored by heating in a closed container at 212°F, the ratio of carbon dioxide produced to oxygen used was 0.66.

There is no doubt that lactose is the principal source of the carbon dioxide given off during the discoloration of the milk under a high heat treatment.

Color and Flavor Improved

Evaporated milk was improved in color and flavor by replacing the oxygen in the free space in the can with nitrogen before the milk was sterilized.

In this experiment the nitrogen containing cans and a control can with the usual oxygen in the free space were sterilized in a commercial plant for 15 minutes at 242°F and at 243°F.

In comparison with the control can of ordinary evaporated milk, those with the nitrogen was found to have only a mild caramelized flavor.

In other experiments, when some of the oxygen dissolved in the milk was removed, and the oxygen in the free space was reduced to 0.69% before sterilization, the resulting evaporated milk had an even greater improvement in color and in flavor.

N. P. Tarassuk is Assistant Professor of Dairy Industry and Assistant Dairy Chemist in the Experiment Station, Davis.

ABSTRACTS OF NEW PUBLICATIONS

BRUSH REMOVAL

IMPROVING CALIFORNIA BRUSH RANGES, by R. Merton Love and Burle J. Jones. Cir. 371, August, 1947. (31 pages).

Not all of the 10 to 20 million acres of brushland in California can be cleared profitably, but large areas can be made to support additional livestock.

Well-planned programs of brush removal by individual ranchers can change certain adaptable California brushlands into valuable grasslands that produce greater crops of meat and wool.

Any brush clearance project must be well planned if it is to succeed. It involves the choice of areas which will offer support for forage growth after clearance, the proper clearing of the land through fire and machinery, and reburning of cleared lands at intervals to prevent regrowth of brush.

The second phase of range improvement is revegetation. The area should be examined before burning to determine whether or not artificial seeding will be necessary to establish a forage crop. After the crop is established, adjusted grazing is essential to insure permanent stands.

Information on this three-fold plan for improving range lands through removal of brush, revegetation of cleared areas, and control of grazing is to be found in the circular listed above.

HOME FRUIT GROWING

HOME FRUIT GROWING IN CALIFORNIA, by W. L. Howard, revised by Reid M. Brooks. Ext. Cir. 117, September, 1947. (81 pages).

Deciduous fruit trees for the small home orchard can be grown almost anywhere in California, within the limitations of climate, site, and soil.

The kinds of fruit to plant depend upon the geographical location, the owner's taste, and the amount of land available. With sufficient irrigation water, favorable climatic conditions, and enough space, a good selection might be apples, apricots, peaches, plums, pears, cherries, walnuts, and almonds. If possible, one should try to have a succession of fruits ripening, from the earliest to the latest.

Trees may be selected from many good nurseries in the northern and the southern parts of the state, and should be ordered as early in autumn as possible, for tree digging begins in December.

In most parts of California, the best time to plant deciduous trees is January, when the trees are dormant; evergreen trees on the other hand, may be planted at any time if the roots are balled or in containers.

Immediately after deciduous trees are planted, the tops should be shaped so that growth will be directed properly. Care should be taken to keep young trees adequately watered. A continuous program of irrigating, pruning, and spraying will prove rewarding.

Climate, soil, site, selection of trees, planting, and cultural operations for both standard and dwarf fruit trees, and for nut trees, vines, and bushes are discussed in this revised circular for the home fruit grower.

DONATIONS FOR AGRICULTURE RESEARCH

Gifts to the University of California for research by the College of Agriculture, accepted in September, 1947

BERKELEY

Italian Swiss Colony $500.00
Division of Plant Nutrition
Sugar Research Foundation 880.00
(First installment of total grant of $3,550.00) Division of Plant Nutrition
Sugar Research Foundation 750.00
(One-half of $1,500.00 grant) Division of Food Technology

DAVIS

California Fertilizer Association $1,500.00
(One-half of $3,000 grant) Research with fertilizers

MISCELLANEOUS GIFTS

American Cyanamid Co. ..... 5 lbs. of 15% 3422 wettable powder
3 drums insect or fungicide Agric NOIBN O/T Liquid.
Chipman Chemical Co., Inc. ..... 5 lbs. of Berako Livestock Spray Powder
The Dow Chemical Co. ..... 1 bag DN Dust, weight 76 lbs.
1 drum DOWAX, weight 55 lbs.
2-1 gal. drums agricultural insecticide OTIQ
1 Fibre Pak Agricultural insecticide OTIQ.
Mr. Leo Gardner ..... 100 lbs. 5% DDT dust containing 1% oil
100 lbs. 5% DDT dust containing 2% oil,
100 lbs. 3% DDT dust containing 2% oil.
O. E. Linck Co. ..... 4 lbs. FAT HOG-EEZ
Merck and Co., Inc. ..... 5 lbs. Potassa Sulfurated
Rohm and Haas Co. ..... 100 lbs. Rhothane WP-50
2 bags—50 lbs. each RHOTHANE WP-50