

California

AGRICULTURE

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

Vol. 1

SEPTEMBER, 1947

No. 10

Stone Fruits On Peach Root Resist Bacterial Canker

Leonard H. Day

Stone fruit growers should consider the use of peach roots in areas where bacterial canker—commonly known to growers as Sour Sap and bacterial gummosis—is a major problem.

To be considered are the compatibility of the peach root with the desired fruit variety and whether the soil and other conditions prevailing are favorable.

Bark Cankers

The most conspicuous phase of the disease is the development of bark cankers on scaffold branches or on the trunks above the graft unions, with or without copious exudation of gum.

When a branch or trunk is completely girdled by the disease the parts above soon wilt and die.

That type of the disease without copious gumming is commonly called Sour Sap by the growers.

The cankers do not progress downward more than an inch or two below ground, and the infections seldom begin in the rootstocks.

In case of susceptible rootstocks, and with the graft union well above

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Leased Farm Lands In California Now Less Than In 1940

Arthur Shultis

Extract of talk given before the California Chapter, National Institute of Farm Brokers, Davis, June, 1947.

Much of California's leased land, particularly rice, grain, and grazing land, is farmed by part-owners who own farms and lease additional land.

Tenants who lease all the land they farm, declined from 19% of our total farm operators in 1940 to 12% in 1945.

In 1940, 41% of our total land in farms was rented and this declined to 34% in 1945—the lowest since 1925.

Decline In Leasing

The decline in leasing is the result of good farm incomes during the war years, which enabled more farmers to buy their farms or to buy additional land that was formerly rented.

Farms formerly held by financial institutions and rented temporarily have practically all been sold to farm operators.

The relocation of Japanese farmers in 1942 may also have contributed somewhat to this decline in tenancy.

There also has been considerable purchase of California farms by newcomers and new farmers from other occupations.

Land Values Leveling Off

It is probable that leasing of farm lands in California is at its lowest point for some time.

Land values are about at their peak and are expected to decline somewhat with the expected decline in prices of farm products. Buyers will wait in a declining market.

Some of the farms recently purchased may become distressed through heavy indebtedness or improper operation and come back in the market for sale or leasing.

Even with some decline, land values will remain high and young farmers will find it easier to rent rather than to buy.

Leasing Worthwhile

As practiced in California, leasing of agricultural land is a worthwhile device for the gradual transfer of

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Yield And Quality Of Raisins Improved By Harvesting When Grapes Are At Full Ripeness

H. E. Jacob

The most advantageous time to pick raisin grapes for sun drying represents a compromise between two considerations: (1) The larger yields and better quality obtained from

whereas at 24° Balling, 547 pounds may be expected—a difference of 91 pounds, or 20%.

In California the average yield of Thompson Seedless grapes is about

Well-ripened grapes not only give greater yields of raisins than unripe grapes, but the quality of the raisins is also better.

It can be said for natural sun-dried



Turning grapes on wood trays. An empty tray is placed upside down over a full one, then both are "flipped" over as illustrated. (Photo by Laval)

well-ripened fruit, and (2) The more favorable drying conditions early in the season.

The main constituents of ripe grapes are water and sugars. Other substances—acids, cream of tartar, proteins, fats, minerals, aromatic compounds, fiber and other insoluble materials—are present in smaller amounts.

Water constitutes 70% to 80% of the grape. Sugars, mainly dextrose and levulose constitute about 15% to 25%. As maturity of the grapes advances the sugar content increases, and the water decreases.

When grapes are dried into raisins, from 90% to 95% of the water in the fresh fruit evaporates, but nearly all of the sugars and other solid materials remain in the raisins.

Dry raisins contain only about 15% water, and from 62% to 72% sugar according to the variety of grapes and the method of drying used in making the raisins.

Sugar Content and Yields

The approximate sugar content of fresh grapes is usually measured by means of an hydrometer test of the juice pressed from the fruit.

The hydrometer—Balling or Brix—is calibrated to read "per cent sugar," but since all dissolved substances affect the reading, the result is more properly termed "degree Balling" or "degree Brix" or per cent soluble solids. It is always from one to two degrees higher than the true sugar content of the grape juice.

Grapes are usually harvested for raisins when the juice tests somewhere between 20° and 24° Balling.

A ton of fresh Thompson Seedless grapes at 20° Balling will make 456 pounds of natural sun-dried raisins,

6.5 tons of fresh grapes per acre.

If the grapes were harvested at 24° Balling, the yield of raisins from an average acre of vineyard would be about 591 pounds greater than if they were harvested at 20° Balling—the difference of 91 pounds multiplied by the average yield of 6.5 tons.

At the 1942 raisin price level of \$113.00 per ton—the \$312.00 price of 1946 is now only a memory—the increased yield would be worth about \$33.39 an acre.

Drying Time

As the season advances, the days become shorter, the temperature becomes lower, and occasional damaging rains are more probable.

At Fresno, the mean temperature for August is about 79.5°F; for September, 72.0°; and for October, 62.3°.

Average Thompson Seedless grapes will dry in about 12 days with a mean daily temperature of 80°F; but at 70° about 20 days are required. At 60° about 40 days are needed for drying. These figures apply only to the natural sun-drying process. Dipped grapes dry more rapidly. Muscat grapes require about a half-longer time to dry than Thompson Seedless.

Thompson Seedless grapes picked in early September may be expected to dry in two to three weeks. Those picked in late September are likely to require four to six weeks, and any grapes picked in October are likely to be damaged by rain if they are sun-dried.

In the 24 years of 1913 to 1946, inclusive, the earliest rain apt to cause serious damage to raisins in the Central San Joaquin Valley, occurred on September 19, 1939. Eight of the 34 years had rain by September 30th and 14 years had rain by October 10.

raisins not damaged by rain, that the riper the grapes the better the quality of the raisins.

Raisins made from grapes of less than 20° Balling, are nearly always inferior or substandard in quality. Raisins made from grapes of 21° to 23° Balling, are usually of average or standard quality. Those made from grapes over 23° Balling, usually are of superior quality.

Raisins dried by other processes, such as "golden bleached," do not always follow the rule for naturals that the riper the grapes the better the quality of raisins. In "golden bleached" raisins, the color of the raisins assumes great importance, and overripe grapes which may have some partially dried berries will produce raisins of nonuniform color.

For such raisins, a uniform yellow color of the fruit is probably the best index of maturity, so far as quality of the raisins is concerned.

Yields of "golden bleached" raisins follow the degree Balling of the fruit, not the color.

General Rules

On the basis of the information now at hand, several general rules regarding the time to harvest raisin grapes may be formulated:

(1) Grapes of less than 20° Balling should not be dried for raisins except as a salvage operation to avoid loss.

(2) Grapes for natural sun-dried raisins should reach 23° or 24° Balling, if such maturity can be attained by September first or soon thereafter. Picking should start soon after the grapes reach 23° Balling or September first, whichever is the earlier.

(3) All Thompson Seedless grapes for natural sun-dried raisins should

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Suggestions For Grazing Lambs On Irrigated Pasture

Robert F. Miller

The fattening of lambs on irrigated pastures is not without its problems.

There have been some heavy losses due to a feed reaction when lambs were first turned into rich clover fields, trouble from parasites, particularly coccidiosis, from overstocking and possibly from bloat.

Suggestions

Experience in the handling of lambs on irrigated pasture is important.

Following are a few helpful suggestions in grazing lambs on irrigated pastures:

(1) Provide ample forage at all times. Do not overstock—10 to 12 lambs per acre is generally about right.

(2) Thrifty, fleshy feeders averaging about 70 pounds do best. Thriftiness is more important than size.

(3) Maturity of forage is important. Clover blossoms are high in nutritive ingredients. Short, immature clover lacks fiber for proper digestion and is also low in nutrients.

(4) In rotation grazing, change fields frequently. Keeping the feed uniform eliminates feed reaction.

(5) Sort lambs at the end of two

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Present and Future Research In Dairy Industry Problems

The following abstract is from an address given before the Quarterly Meeting of the Dairy Institute of California at Eureka, August 21, 1947, by E. L. Jack, Chairman of the Division of Dairy Industry, College of Agriculture.

Now under way in the Division of Dairy Industry are technological researches endeavoring to improve processing techniques in the following products: control of flavor defects in market milk, processing methods to improve the nutritive value of cottage cheese, the use of carotene as a coloring agent for butter, the improvement of flavor and color in evaporated milk, improved processing methods for dry milk, the control of physical defects in ice cream, and the correct usage of water softening and cleansing agents.

New Basic Knowledge Sought

In addition to the above researches on specific dairy products we are seeking new basic knowledge with respect to the effect of heat on milk proteins, the chemistry and nutritional value of milk fat, the nature and mode of action of milk enzymes, and the chemistry and interaction of lactose and the milk salts and proteins.

Cooperative Studies

In cooperation with the Department of Home Economics studies are being made of the food uses of milk proteins, particularly dry milk.

With the Division of Agricultural Engineering we are studying the bulk handling of milk from ranch to factory.

The Division of Animal Husbandry and the Division of Dairy Industry are cooperating on problems of animal physiology related to milk quality.

The Division of Chemistry is cooperating on physico-chemical problems in frozen dairy products.

Cooperative studies with the Division of Poultry Husbandry are being made of the problems in food acceptance and nutritional values.

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Supplemental Feed Supplies Leached Nutrient Values

H. R. Guilbert

An inch, or even less, of rain on dried range feed can leach out the soluble sugars, 10% to 20% of the protein, and as much as 60% of the mineral.

The remaining 80% to 90% of the original tonnage is higher in fiber content, lower in digestibility, and is less palatable to livestock.

A feed capable of producing one-half to one pound gain a day before leaching may be reduced in nutrient values that it is not adequate for more than maintenance.

Feed that was only maintenance feed before leaching may become so deficient in nutritional value that livestock feeding on it will lose weight.

Loss of Weight

Usually weight shrinkage begins in cattle on foothill ranges in August or September. Frequently it begins earlier where there is little or no legume forage, such as bur clover.

The increased use and acreage of irrigated pastures have helped some stockman meet the problem of shrinking stock weights. Such acreage is not yet adequate, generally, to make a balanced operation—with native feed—to form a year-long program of adequate nutrition and continuous growth and development of the cattle.

When weight losses begin, the cattle literally are supplementing the range feed with their stored weight.

Body fat is used to make up the difference when energy derived from the feed is insufficient to meet the needs of the animal for maintenance of body processes, the regulation of body temperature and for the necessary traveling.

As soon as feed dries—unless it contains ample legumes—the supply of protein is inadequate. The supporting muscles of the animal and the muscles of locomotion are drawn on for the protein necessary to the vital organs. As the fat reserves are exhausted, the muscles are drawn on at a more rapid rate to supply the energy deficit.

Supplemental Feeding

Not many years ago the cost limit for carrying a cow one year was considered to be about \$10.00 to \$12.00. To spend an equal amount for supplemental feed was thought to be a quick road to bankruptcy.

Supplemental feeding has been shown to return from \$1.50 to \$2.00 for every \$1.00 spent.

That is the experience record on the San Joaquin Experimental Range where an average of 365 pounds of supplemental feed per cow per year were required to maintain the breeding herd in condition uniformly to produce over 80% calf crops, and 450 to 500 pound weaner calves.

These records do not include the extra value per pound of the calves—the greatest salvage value of the cows—or the lower death losses, nor the opportunity to improve the herd faster by breeding and selection.

For the last eight years the production per breeding cow averaged 108 pounds more in calf weight at weaning.

At current feed prices, 365 pounds of supplemental feed would cost \$12.00 to \$14.00 to produce 100 pounds more calf, worth over \$20.00.

At a conservative estimate at least half of the beef cattle in California will lose 100 pounds or more apiece before next January or February—the loss of 70 million pounds of beef steak.

Supplemental feeding should be cheaper than beef steak even when protein and other feeds are high in price.

Preventing weight losses by beginning supplemental feeding early with small daily quantities is cheaper and more effective than trying to recover weight after it has been lost.

Insuring the next calf crop begins now with breeding herds. A hundred pounds more of weight per animal at the end of the next grass season should pay for a lot of feed.

H. R. Guilbert is Professor of Animal Husbandry and Animal Husbandman in the Experiment Station, Davis.

The Division of Pomology is making a study of the problems of the fig industry in California.

New Heat-expanded Minerals Of High Water-holding Capacity — Good Aids In Plant Propagation

V. T. Stoutemyer

Recently two relatively inert mineral substances have been tested which appear to have numerous uses in plant growing, especially in operations connected with plant propagation. These are heat-expanded vermiculite and perlite.

Vermiculite is obtained by heating a miscaceous mineral and perlite is prepared from a volcanic material.

These two substances are quite different in appearance and physical characteristics, but are similar in having remarkable porosity and water-holding capacity. Both are useful in that they assist in the development of completely or partly automatic methods of propagation which reduce the attention needed and increase the certainty of success.

Rooting Medium For Cuttings

Expanded vermiculite is probably the finest material yet introduced as a medium for the rooting of cuttings.

Large natural supplies of vermiculite are available. At the present time most of the material comes from Montana, although some is produced in Wyoming and North Carolina.

potting mixtures and as a packing material for the storage of bulbs, corms and roots such as dahlias.

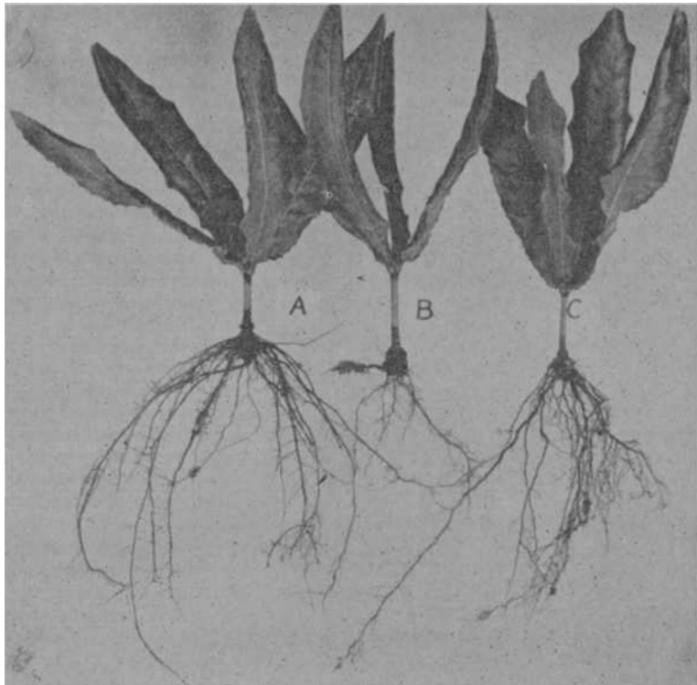
When used for cuttings, vermiculite should be watered repeatedly before using, since the absorptive capacity is great.

Whether used for cuttings or seedlings, care should be taken not to pack vermiculite, since it then loses its porous structure and becomes reduced in volume, which in turn causes a poor aeration.

Cuttings may be pushed in the loose material and then watered thoroughly to settle the material around them. Cuttings are normally rooted without the application of mineral nutrient solutions. Unusually heavy root systems are formed which are well adapted to potting.

Watering by capillarity is ideal for the germination of seeds in vermiculite and produces the finest possible results, since the surface is uniformly moist at all times. This may be accomplished very easily by placing the pots or pans containing the seeds in a shallow tank of water.

If the vermiculite is moistened be-



Cuttings of Queensland Nut—*Macadamia ternifolia*—made from the ends of terminal shoots. (A) Rooted in vermiculite. (B) Rooted in sand. (C) Rooted in expanded perlite.

Heavy demands for use in house insulation and for the preparation of certain types of concrete and plaster have restricted the horticultural uses of this material to some extent.

Expanded vermiculite has enormous areas of interfaces between the laminations which give an unusual water- and air- holding capacity. Much less watering is needed with vermiculite than is necessary with sand as a rooting medium. Often no additional watering is needed after the cuttings are set until they are rooted.

Varying Grades

A number of commercial grades of vermiculite are now available. The coarsest is commonly sold as a poultry litter. This can be used for cuttings and apparently has some possibilities for use in soilless plant cultures.

The house insulation grade appears to be particularly good for cuttings and can also be used for germination of seed, although for the finer seeds there is an advantage in reducing the size of the material by screening.

Care should be taken to avoid the use of vermiculite which has been treated with waterproofing materials, and for this reason the use of the concrete or plaster aggregate sizes is not recommended, but grades especially prepared for horticultural use may be obtained under proprietary name.

Advantages

Among the advantages which can be enumerated for vermiculite is the sterile nature of the material because of the high temperatures which are used in preparing it. It is clean, light in weight and reasonable in cost, and is normally obtainable anywhere.

In addition to its uses in propaga-

tion fore sewing the seeds, the moisture is maintained continuously by capillary action and surface watering is not needed.

Fine seeds may be sown on the surface of the material without covering, if sub-irrigation is used.

Nutrient Solutions

Applications of mineral nutrient solutions are needed occasionally if seedlings of any but the smallest size are desired.

One of the commercially available solutions may be applied to the material before the seeds are planted and at occasional intervals after germination in order to maintain growth.

If desired, a satisfactory substitute may be prepared by mixing about four teaspoonfuls of the average mixed complete garden fertilizer having an analysis of approximately 4-12-4 or 5-8-6 in a gallon of water. A portion of the fertilizer may not dissolve, but sufficient will be available to produce satisfactory seedlings.

Another useful solution is made by adding one teaspoonful each of potassium nitrate and superphosphate to a gallon of water.

Both seedlings and cuttings are easy to remove from vermiculite and much of the material remains attached to the root systems. Often the roots are exceptionally heavy and well adapted to potting or transplanting.

If as much of the material as possible is left attached to the roots, the plants are often remarkably resistant to adverse conditions at the time of transplanting.

Possibilities of Perlite

Expanded perlite has interesting horticultural possibilities, although less experimentation has been conducted with it.

Suggestions For Grazing Lambs On Irrigated Pastures

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weeks. Reject all angular—hat rack—types and all that have not filled. Dispose of these.

(6) A long haul is hard on feeder lambs. Never turn half-starved lambs on rich clover. Turn on poor barley stubble—feed some hay—rest two or three days, then turn in.

(7) Ailments—scours indicate feed reaction, intestinal parasites or coccidiosis. Call a State Veterinarian. Segregate affected animals and keep on dry feed such as volunteer grain hay. Mix one pound of phenothizine with each ten pounds of salt; and keep mixture before the lambs at all times.

(8) When a break occurs and lambs scour badly, take them off clover. Feed dry hay in small amounts for the first few days. In 10 days the lambs may be turned back on pasture. Cull out the sick ones and segregate any lambs showing signs of foot rot.

(9) Access to dry hay during the summer is good practice. It is essential after September first. If grain is fed, whole milo is preferred to barley, especially at the beginning.

(10) Good management and daily attention are very important.

Clover Pasture for Lambs

It has been found that straight clover fields produce the highest gains in lambs.

When straight clover is planted there is usually an infiltration of native grasses and weeds which furnish some variety of forage.

When several of the common grasses are planted along with the clover, the grasses usually become rank and coarse due to the fact that the lambs prefer the clover. In this case, the field should be clipped with a mower to keep grasses from crowding out the clover, and to eliminate the coarse forages.

Birdsfoot Trefoil

The latest arrival in the pasture group is Birdsfoot Trefoil — *Lotus Corniculatus*—a legume similar to alfalfa and especially well adapted to the heavy alkali type of soils. While it probably does not make quite the profuse growth and abundant forage as the ladino clover, it does have the advantage of requiring less frequent irrigations.

Lambs very seldom bloat when grazing on birdsfoot trefoil.

It is a particularly hardy plant, withstanding flooding and even grazing in the winter time.

Birdsfoot trefoil has become quite popular as an irrigated crop in California.

Robert F. Miller is Professor of Animal Husbandry and Animal Husbandman in the Experiment Station, Davis.

The material has great absorptive powers, but the capillary movement of water is somewhat less than in vermiculite. The structure is apparently more resistant to breakdown from handling than is the case with vermiculite.

Tests conducted in the Division of Ornamental Horticulture on the Los Angeles campus have shown it to be an outstanding medium for the rooting of cuttings.

If the coarser grades are used, the heaviness and speed of rooting produced are very similar to that obtained with vermiculite. This material has other horticultural uses similar to those of vermiculite.

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ABSTRACTS OF NEW PUBLICATIONS

OLIVES

CALIFORNIA OLIVES: SITUATION AND OUTLOOK, 1947, by Arthur Shullis. *Cir. 307, July, 1947. (23 pages).*

What prices and earnings can be expected from olives over the next ten years? Will it pay to plant additional orchards? These and similar questions are important now to those who are interested in growing and handling olives.

Practically all the olives produced in the United States are grown in California. Canned ripe olives have been the principal outlet in recent years, usually returning two or three times as much as oil. Only since 1940, with lower imports of olive oil and high prices, have olives for oil been a profitable outlet to growers.

The size of the fruit and the oil content determine the use which is made of the different oil varieties. The two leading ones, Manzanillo and Mission, are medium—to small-fruited. Mission is a good oil olive, while Manzanillo is the best general-purpose variety. The Seviliano and Ascolano are large-fruited varieties used almost entirely for canning. Large olives, being in more limited supply and selling for higher prices when canned, bring a higher price per ton than the smaller ones.

The price a grower receives depends on the kind, size, and quality of olives he has to sell, the use the buyer thinks he can make of them, and the price the buyer expects to receive for the processed olives and the oil. The price outlook for canning olives is much better than for those to be used only for oil. However, the canning outlet is limited, and in years of high production a number of olives suitable for canning may have to go for oil.

Present acreage and recent trends in yield and total production of olives indicate an upward trend in total production. Definite answers to questions on the outlook for California olives are not available, but it is possible to project into the future some of the factors of changes in supply and demand in the past. The circular listed below has been prepared to present some of these facts with a little interpretation. It is now available at the College of Agriculture.

FIELD RODENTS

CONTROL OF FIELD RODENTS IN CALIFORNIA, by Tracy I. Storer. *Ext. Cir. 138, August, 1947. (51 pages).*

Damage done by field rodents to agricultural crops amounts to several millions of dollars every year. Some rodents carry bubonic plague, tularemia, and other serious diseases that may be transmitted to man directly or by fleas, ticks, or mites.

Effective control is not easy; it involves more than merely setting a trap or scattering some poisoned bait. Good results can be expected only by understanding the habits of the rodent to be controlled, and by controlling throughout the year so that the number of rodents never becomes large.

Methods include the use of poison baits and poisonous gases, trapping, shooting, exclusion, and the encouragement of natural enemies. Community cooperation will prevent a cleaned area from becoming repopulated by rodents migrating from neighboring infested land.

Injurious rodents in California include squirrels, gophers, moles, and rabbits. The habits of these animals, methods of control, and precautions, are covered in the above circular, now available at the College of Agriculture.

DONATIONS FOR AGRICULTURE RESEARCH

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

California Committee on Relation of Electricity to Agriculture.....	\$2,500.00
Division of Agricultural Engineering	
William H. Boynton.....	157.53
Division of Veterinary Science	
International Minerals & Chemical Corp.	2,500.00
Division of Plant Nutrition for research on the growth of sugar beets.	
U. S. Public Health Service.....	4,903.00
Division of Plant Nutrition for research on the utilization of carbon dioxide and synthesis of fatty acids by bacteria.	
U. S. Public Health Service.....	1,836.00
Division of Zoology for research in rodent control.	
Winthrop Chemical Co.....	1,800.00
Division of Food Technology for research in frozen foods.	