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# SEVENTY-FIRST ANNUAL REPORT 1957-1958

**RESEARCH  
SERVES  
COLORADO  
AGRICULTURE**

**AGRICULTURAL  
EXPERIMENT  
STATION**

**COLORADO STATE UNIVERSITY • FORT COLLINS, COLORADO**

**Letter of Transmittal  
Seventy-First Annual Report  
Colorado Agricultural Experiment Station**

Honorable Stephen L. R. McNichols  
Governor of Colorado  
Denver, Colorado

Sir:

In compliance with the act of Congress, approved March 2, 1887, entitled, "An act to establish Agricultural Experiment Stations, in connection with the colleges established in several states under the provisions of an act approved July 2, 1862, and under the acts supplementary thereto," I herewith present the Seventy-first Annual Report of the Colorado Agricultural Experiment Station for the fiscal year of July 1, 1957 to June 30, 1958.

Fort Collins, Colorado  
July 1, 1958



S. S. Wheeler  
Director

SEVENTY-FIRST ANNUAL REPORT

# RESEARCH SERVES COLORADO AGRICULTURE



AGRICULTURAL EXPERIMENT STATION ● COLORADO STATE UNIVERSITY

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# FIELD CROPS AND SOILS

In a five-year non-legume rotation, responses in yield of wheat, barley, and corn were obtained from nitrogen-phosphorus, but nitrogen alone gave the most economical returns. No response was obtained from phosphorus alone.

In an eight-year alfalfa rotation, there was no corn response to N or P alone or in combination. Increase in yield of wheat and barley was obtained from P, N, and NP, however. As with the five-year rotation, the small grain gave the most economical return to N alone.

Experiments in sorghum improvement were conducted at the Central Great Plains Field Station at Akron under dryland conditions, at the Southeastern Colorado Branch Experiment Station at Springfield under dryland conditions, and at the Arkansas Valley Branch Experiment Station at Rocky Ford under irrigation. High varieties in order of yield were as follows:

Akron—Midland, Ch-55, 001, Combine Hegari and Combine 7078.

Springfield—Texas 601, Asgrow R-12, DeKalb E-56A and DeKalb D-50A.

Rocky Ford—DeKalb D-50A, Asgrow R-12, Nebraska Experimental No. 26, and Frontier 410.

Field plot experiments were conducted to determine the influence of irrigation practices on soil structure and plant growth. Irrigation by flood, furrow and sprinkler was conducted on the sub-plots using identical amounts of water. Yields of sugar beets were only slightly lower, as an average, on the compacted plots. Sugar content, however, was greater, resulting in higher total sugar produced under the compaction. This may be a direct result of lower average individual beet weights.

Field and greenhouse experiments were conducted to study the availability of phosphate fertilizer as affected by phosphate material, method of application, chemical and physical properties of the fertilizer, and carry-over effects of previous applications. Results of the field experiments showed:

1. Where phosphate was plowed to 16 inches for sugar beets, the yield of sugar was greater than where phosphate was plowed to 8 inches.

2. Phosphate applied with the seed produced higher yields of winter wheat

than comparable amounts plowed down.

3.  $\text{NH}_4$ -Nitrogen applied with phosphate in bands had little effect on phosphate absorption by winter wheat.

4. Plow-down applications of phosphate were more effective for alfalfa than surface broadcast applications.

Nitrogen improves mountain meadows, research showed. Mountain meadow research involves the conversion of energy to forage and its result expressed in beef production per acre. A five-year average shows that phosphorus fertilizer increased the yield over a non-treated check plot 930 pounds, and that nitrogen fertilizer increased the yield over check by 3,250 pounds per acre. The percent of applied nitrogen recovered, average of five years, was 43 percent. It was determined that a heifer on feed under this experiment can reach 1,000 pounds in 517 days, as compared with 738 days under usual ranch management. Good water management, with nitrogen fertilization, good management of the forage, combined with high quality livestock, gave a carrying capacity on a year-round basis of about one acre per animal. This compares with the usual Colorado mountain meadow carrying capacity of four acres per animal unit.

Crop production in the Upper Colorado River Basin is limited by poor drainage, excessive salts and alkali, low fertility and low organic matter soils. Obtaining adequate drainage is most important, and the removal of excess soluble salts and sodium is the second step. Next, soil and crop management problems can be considered. Drainage studies have shown that seepage from irrigation canals and laterals is contributing to the drainage problem in the area. Progress has been made recently in the use of bentonite linings for seepage control. Soil reclamation studies show the feasibility of reclaiming a typical saline-alkali soil of the Basin. A project is now under way to determine practical methods of applying soil reclamation principles on a field scale. In the management of saline and alkali soils, water in excess of crop requirements must be applied to prevent the accumulation of excessive amounts of salts and sodium.

# LIVESTOCK AND POULTRY

Weanling grade Hereford heifer calves were wintered on winter range with four pounds of alfalfa hay for three winters. One group received 10 mg. stilbestrol daily in either a corn-cob-molasses or dehydrated alfalfa pellet, while another group received the pellet without the stilbestrol. Daily gains this past winter were 0.59 pounds for the non-stilbestrol-fed group, while the stilbestrol-fed group gained 0.93 pounds daily. The stilbestrol-fed heifers were bred and showed 100 percent pregnancy on palpation. One lot calved without incident and with more ease than with normal heifers.

Five lots of cattle were fed the following types of silages during a 110-day period — mature corn silage, immature corn silage (two lots), dry ground ear corn, and ear corn silage. Results showed:

1. Immature corn silage has less feed value than mature corn silage for fattening steers. Feeding the same dry weight of immature corn silage as mature corn silage produced less gain in steers, showing that immature corn silage has less energy value.

2. Steers fed ear corn silage required 10 percent less equivalent dry ear corn to produce 100 pounds of gain than steers fed dry ground ear corn.

3. On the basis of these experimental results, the value of the total corn crop harvested and fed as ear corn silage and stalk silage would be \$11 per ton.

Twelve lots of 21 lambs each were self-fed on pelleted rations in the spring of 1957. Some of the results were as follows:

1. Lambs can utilize large pellets as efficiently as small pellets (up to 1 x 1¼ x 1¼ inch wafer).

2. Milo in a pellet with equal parts of alfalfa hay gives as large and efficient gains as when the milo is replaced by corn.

3. The addition of certain minerals to a pellet of equal parts corn and alfalfa hay gave essentially the same gains but increased efficiency.

4. Alfalfa hay ground through a ¼-inch screen gave larger gains and as efficient gains as alfalfa hay ground through a 1/16-inch screen when both were made into a pellet with equal parts corn.

Nutritionists found the addition of grain to the wintering ration of calves increased daily gains and shortened the time to reach



*Feeding trials show that lambs can utilize large pellets as efficiently as small pellets.*

desirable market weights during the summer fattening period. In addition, a higher percentage of carcasses graded choice when the winter ration was supplemented with grain. From the standpoint of economy and efficiency of feedlot gains for the combined winter and summer feeding periods, however, there was more advantage in winter feeding both heavy (526 lb.) and light (426 lb.) weight calves on a roughage ration without added grain. This was particularly true with light weight calves.

Scientists compared weight gains of a group of Holstein steers which received 10 mg. of stilbestrol as compared to a control group. The stilbestrol-fed group gained 2.4 pounds per day and returned \$35.70 above feed costs. The control lot gained 2.1 pounds daily and netted \$22.91. At present two pens of 14 steers each are on a feed test. One lot receives hay and silage but no grain, while the other group receives one pound of hay per day, plus free choice beet pulp and grain. Half of each group is implanted with pellets containing stilbestrol and progesterone. So far the implanted cattle are making much greater gains, the beet pulp is producing larger gains, and there appears to be a favorable interaction between the beet pulp feed and implantation.

Poultrymen studied the value of various litter materials for turkeys, namely wood

chips, shredded sugar cane stalks, wood shavings, corn silage, ground corn cobs and chopped wood sticks. Results so far indicate that chopped corn cobs about one inch in diameter are most satisfactory. The cobs seem to move sufficiently as the birds walk over them to prevent the forming of a heavy crust at the surface. The next most desirable material appears to be wood shavings.

In a study of inbred turkeys crossing of inbred lines enhances fertility and hatchability of the stock over the inbred lines by themselves. This was one of the preliminary results of a Station experiment on the development of inbred lines of turkeys. Poultry scientists found a distinct pattern or trend of hybrid vigor through the crossing of inbred lines by increases in average egg production and other reproductive performance characteristics.

In a protein study over two years scientists found that the 13 percent level is equal to either the 15 or 17 percent protein ration for egg production. Egg production, feed efficiency, interior egg quality, shell quality and egg size were observed. In all cases, the lower protein level was found to be sufficient. This can mean a saving of approximately \$100,000 per year to Colorado poultrymen if the 13 percent protein ration is substituted for current type rations.

## CONTROL OF INSECT PESTS

Seasonal populations of the various insect species—insect pests as well as those which enter into the biological control of these pests—were followed through the growing season by the use of various standard methods of sampling. It is important to know when a pest is on the upsurge, when it migrates into the state, or if it is not in economic numbers. Information of this type is disseminated each week to interested persons in industry and agriculture, and later assembled in an annual summary for the season. The Colorado program has received attention nationally from the Entomological Society of America and the U. S. Department of Agriculture.

*Control of Klamath weed can be accomplished by small beetles which strip the plants of their leaves.*



Surveys were made in potato fields of certified growers in the San Luis Valley and northeastern Colorado to determine aphid and leafhopper species and populations. Several of these insects are recognized vectors of potato viruses. In addition, samples of matrimony vine were collected in the two important seed-producing areas for greenhouse test-

ing for the presence or absence of potato viruses.

After three years of research, results show an average of two or more eggs per 100 leaves of tomato plants is necessary before fruit worm controls are justified. This project is being conducted at the Arkansas Valley Branch Experiment Station.

## HORTICULTURAL AND FLORICULTURAL CROPS

In fertilizer tests with Red McClure and Russet Burbank potatoes at the San Luis Valley Branch Experiment Station, application of 60 pounds of nitrogen and 160 pounds of phosphorus per acre produced the highest yield increases. This treatment of Red McClures increased yields by 65 sacks per acre. At \$2 per hundred this would mean an increased return of \$130 per acre, less \$22 paid for fertilizer.

Work with Russet Burbank potatoes in northern Colorado indicates this variety can be grown better if irrigated early and the soil moisture kept at a high level throughout the growing season. Thirty feet from the head ditch the yield was 374 sacks per acre, while 550 feet from the head ditch the yield was

241 sacks. This difference in yield was due to the effect of irrigation runs on sandy soils with the Russet Burbank variety.

Colorado 6, a Sweet Spanish strain, is the standard onion variety now being grown in the Arkansas Valley. It was one of the top yielders in the 1957 harvest but was in sixth place for yields when weights were taken out of storage in January. Some of the best yielding and best keeping hybrids are top crosses. One hybrid, 2264 x C56-1, is slightly lower yielding but considerably earlier and a much better storage onion. Because of these two advantages, in addition to its excellent appearance, it is being increased for possible release.

An early high yielding tomato variety is of great importance to the canning industry in

*Western Colorado fruit growers learn of research developments at the field day of the branch experiment station near Austin.*





view of northern Colorado's short season. Disease resistance is becoming more important and may soon be the deciding factor in the future of the region's tomato industry. During the 1957 growing season a replicated yield trial of 24 potential canning tomato varieties and hybrids was conducted at Fort Collins. This trial showed a number of lines developed in this breeding program to be better than the canning variety now being used in this area. The total yield of the standard variety was less than 70 percent of that of the total yield of one of the breeding lines. This line also surpassed the standard in fruit size, lack of core and early yields.

There is much interest in dwarf fruit trees. Research with dwarf root stocks for pears, peaches, plums and cherries has been under way for several years. The best dwarfing root stock for peaches is the St. Julien Plum variety. Quince is the best dwarfing root stock for pears, although not all varieties are compatible and often form weak graft unions.

Better carnation varieties are gradually being developed through breeding experiments. A new crimson striped novelty will be released during the 1958-59 season under the name of Moonlighter. Some 50 or more unusually fine light pink seedlings are being saved for further tests from the 1957 seedlings.

For the first time it has been possible to compare different rates of treating irrigation water with nutrients in order to find an optimum rate for constant treatment of carnations. This rate promises to be somewhat higher than was previously used.

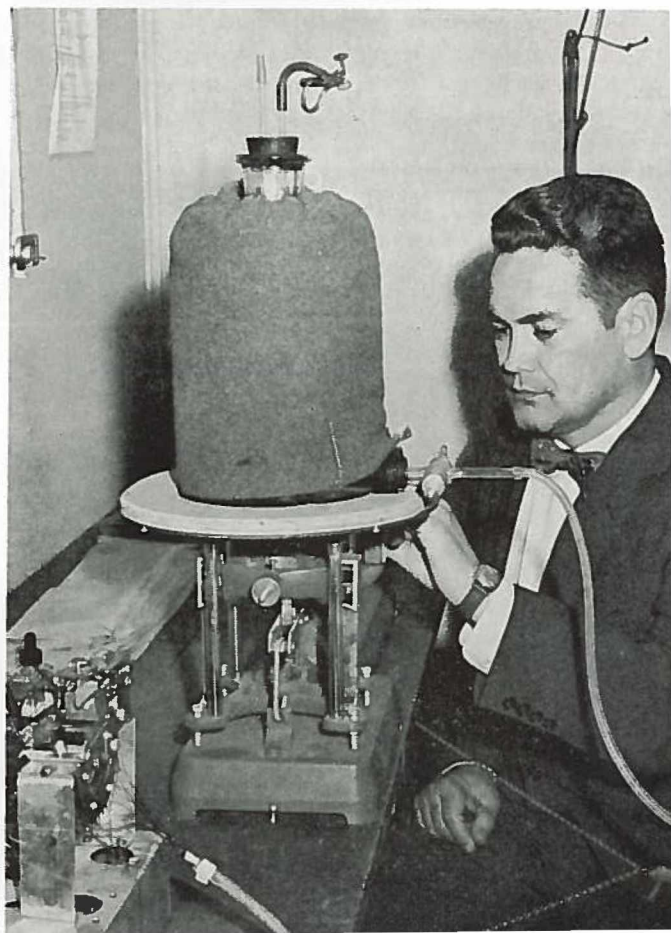
Research on better methods of propagating native plants is under way to provide assistance in landscaping the Air Force Academy at Colorado Springs. Rooted plants are now being transplanted to containers, the purpose being to determine how much time is required to produce suitable sizes for transplanting on the site. Plantings on the site will provide needed data on the adaptability of species to the north, south, east and west locations.

## ENGINEERING RESEARCH

Station experiments show that two types of grass planting equipment have a place for reseeding grass in "go-back" land. One, a lister-type machine, has the ability to plant in a weed cover without prior seedbed preparation. Although this is not the recommended procedure, it is sometimes necessary. The second machine has double disc openers with depth bands recommended for planting in sorghum stubble. As a result of this research, several major implement companies are experimenting with grass planting equipment which incorporates features developed at the Experiment Station.

After observing a commercial green bean harvester in action, Experiment Station engineers suggested certain modifications to improve efficiency of the machine. These recommendations were accepted by the manufacturer. The study shows the machine is satisfactory for use under Colorado conditions and is economical as compared to hand picking.

*Station scientists are studying evaporation of moisture from soil and how it is affected by temperature, humidity, soil type, water-table depth, and radiation.*



Attention will be directed toward mechanical onion harvesting during the coming season. Two types of harvester will be studied for performance, with particular attention paid to elimination of bruising characteristics.

Data on existing farm drains under the most usual conditions in northeastern Colorado have been collected to provide a more comprehensive approach for future drain designs. Measurements were made of physical and soil features, drain discharges, water table positions and hydraulic conductivity. To a great extent, the average flows for the drains reflect the available water supply. In 1957, when there was an ample supply of water, the average flows ranged from two to three times those during 1956 when water supply was limited.

Work is under way to determine the physical principles relating to the movement of water from a water table to the surface of the soil. An important finding is the discovery that the maximum evaporation from a soil occurs under environmental conditions which produce less than maximum evaporation from a free-water surface. When the ambient evaporating conditions are increased beyond a critical value (as by additional input of radiant energy) the rate of water loss from the soil may decrease even though a dry layer will be produced at the surface. This is significant because it points out the futility of using evaporating pans to estimate evaporation from soils.

## RANGE MANAGEMENT AND FORESTRY

Ammonium nitrate was applied to native range at the rates of 16.5, 33.0, 49.5 and 66.0 pounds of nitrogen per acre. One series of the plots had been fertilized continuously for four years previously, and the other two series had been fertilized in alternate years. No significant increases were obtained in yields of blue grama grass, buffalo grass or western wheatgrass on the three series of plots. In the yield of weeds, however, significant increases were

obtained from application of nitrogen. Range scientists reported that increase in the perennial range grasses was so small that the practice of nitrogen fertilization would not appear to be economical even under the favorable moisture conditions experienced in 1957.

In work on improvement of sagebrush land, seedling counts made on an area prepared by use of a brush-beater (mower) showed that the practice of broadcast seeding



*In grass variety trials, research workers must harvest the plots by hand to be sure they obtain accurate seed yield data.*

ahead of the beater gave more seedlings per square foot than that of drilling the seed after the use of the beater. If survival of the seedlings is equally good, then the less expensive broadcast method could be recommended under this type of seedbed preparation.

The stand of grass in the 30-acre blowout on which experimental reclamation methods were started in 1954 continued to increase in density and vigor. Sand lovegrass appears to be the best adapted grass. Bluestems, switchgrass and sideoats grama are becoming more evident each year. A blowout upon which native hay treatment was applied in September, 1955, has not been eroded by the wind since the time of application. The straw cover is still very evident and some grasses and weeds are becoming established in the blowout.

Thirty-seven varieties of grass, seven varieties of alfalfa and two varieties of sweet clover were planted in nursery plots at the Southeastern Colorado Branch Experiment Station near Springfield in a test of grasses and legumes for range revegetation. Two replications were on heavy soil and two on sandy loam soil. Two replications were sprinkler irrigated. Varieties that showed up best

are Vernal, A225, Sevelra and Ladak alfalfa; Madrid and Coldtop sweet clover; Tucson, Nebraska 52, Nebraska 37 and Vaughn sideoats grama; Elkan yellow bluestem; Nebraska 27, FC-24608 and commercial sand lovegrass; and Caddo switchgrass.

Pocket gopher census on areas of the Grand Mesa sprayed with 2,4-D showed an 87 percent reduction in number of gophers. Cooperating personnel of the U. S. Forest Service recorded vegetative changes, showing 70 percent reduction in the amount of forbs present. Gopher stomach samples analyzed by Fish and Wildlife Service personnel showed that as a result of the spraying the diet has changed from one of predominantly forbs to one of only about half forbs.

In reviewing records of fence post studies, researchers found that ten split western red cedar posts treated with a gas-tar creosote hot and cold bath are still in good condition after 40 years of service. Data of a study of on-the-farm treating methods started in 1943 clearly showed that home preservation methods extend the service life two to three times the usefulness of untreated posts. In this study the pentachlorophenol treatments compared favorably with pressure-treated creosote.

## CONTROL OF PLANT DISEASES AND WEEDS

Fermate was found to be an effective dip and/or drench for the control of fusarium stem rot in carnations. Experiments under commercial conditions indicated that dips and/or drenches of Panodrench 4 did not control fusarium stem rot to any greater extent than spraying mother blocks with Captan. Since sprays are easier to apply, the latter recommendation is preferred except in special cases.

In early June, 1957, herbicide treatments were applied to four 6-acre plots of Klamath weed on the Rocky Flats area, eight miles south of Boulder. From a vegetational survey made in October, 1957, it was found that 2,4-D effectively killed tops of plants, but that crown sprouting followed such kill. Furthermore, where tops of the weed were killed, cattle moved in and grazed the remaining vegetation much more heavily than in areas on which there remained a dense stand of tops. Beetles which feed on the Klamath weed were planted in the area several years ago.

Inspection shows the beetles have increased significantly and they are slowly helping to reduce the stand of the weed.

Soil fumigation plots at the Arkansas Valley Branch Experiment Station have indicated some degree of control of pink root and fusarium bulb rot in onions after injection of Vapam into the soil or thorough mixing of Mylone 85W into the upper portion of the root zone. Use of the first of these chemicals in 1956 for control of fusarium bulb rot was successful, so the 1957 test was aimed at testing reduced rates of application and the injection technique. Data from the 1957 study concerning the effect of these materials on pink root severity indicate some value as indicated by reduction in symptom severity on bulb samples at harvest. Data on bulb size are negative, however.

In a study of the healing process in potatoes, four tubers were selected from a single hill unit of Red Pontiac potatoes and each

tuber was carefully halved. One-half of each tuber served as a check while the other half was subjected to one of four treatments as follows: Catechol, Agrimycin, Semesan-bel, and the leaching action of a water jet.

Results showed that none of the chemicals studied interfered with the natural healing processes, while Catechol and Semesan-bel treatments resulted in a greater degree of suberization.

In research over the years, the Seed Laboratory has made several notable accomplishments. Some of these are:

1. A change in technique developed in germinating freshly harvested cereals has eliminated the need for the customary five-day pre-chill period, thereby speeding up reports and greatly decreasing the number of re-tests required.

2. Although considerable variation is apparent between varieties of the same kind of seed, hulled seeds such as barley, oats, and cane show the greatest longevity. These seeds generally germinate strongly enough to maintain seed stocks after 30 years or more. Wheat and corn drop more rapidly, in some instances after 15 to 20 years.

3. Hand-threshed alfalfa seed shows a 57 percent germination after 60 years, and machine-threshed seed shows as much as 54 percent germination after 40 years.

## HOME ECONOMICS

In the experiments on space requirements for clothes storage, reports of the western farm housing survey include tabulations of clothing inventories with emphasis on each type of garment and how many were owned by selected groups of individuals. Computation of the amounts of specific kinds of storage space required for the number of garments reported by each member of a representative sample of western farm families has been completed. Space data have been analyzed to determine the space standards to be recommended for clothes storage facilities in western farm homes.

In work on baking of flour mixtures at

high altitudes, tests indicated that adjustments should be made in cooking procedures and/or ingredients in recipes for flour mixtures baked in the electronic range at an altitude of 5,000 feet. Quick breads, coffee cake, cookies and prepared mix recipes recommended for electronic cookery were tested at that altitude. Recipes previously adjusted in the high altitude laboratory at an altitude of 5,000 feet were adapted for use in the electronic range. Results indicated that adjustments in leavening agent, baking speed and cooking time were necessary when using electronic ranges at high altitudes. Considerable time was devoted to determining the feasibility

*Home economists have developed space standards for clothes storage areas in the home.*



ity of substituting oils for fats in baked flour mixtures.

Nutritionists studied the effect of potato variety on the fat absorption, cooking losses, palatability and tenderness of French fried potatoes. Four specific gravity classifications, determined by the salt density method, were

used for two of the varieties, Burbank and Red McClures. The Triumph variety was also tested. A panel of judges scored the potatoes for each of seven palatability factors. Chemical analyses were made for moisture and fat content of the French fried product and cooking losses were calculated.

## AGRICULTURAL MARKETING

In testing consumer acceptance of beef, in August and September, 1957, a survey of purchases of beef by grade was made with consumers who had an opportunity to purchase two advertised grades. About three in four took advantage of the opportunity. Fewer than one of these three admitted the purchase of a grade lower than "choice." Findings of this study will be presented in the publication, "Purchases Versus Preferences for Beef."

The new method of packing cut flowers developed by Station economists was adopted during the year by a number of wholesalers in Denver. This method involves enclosing the flowers in a polyethylene film and holding them in place in the shipping container with corrugated inserts. First printing of the bulletin describing the process was exhausted and a second printing was prepared. About 11,000 copies were distributed.

As a follow-up to the adoption of the new shipping container, a time and motion study was initiated. This is designed to adapt the methods employed in packaging flowers in order to realize the full potential savings in labor inherent in the box. The ultimate goal is to develop a model for a wholesale florist house that will minimize the cost of preparing flowers for shipment.

An experimental livestock market report for Jackson County, Colorado, was developed. Its purpose was to determine the possibility of reporting country direct sales of cattle on a comparable basis to the "Market News" reports emanating from the major terminal markets. Preliminary analysis was started on the questionnaires received from producers and feeders who were selected to evaluate this experimental release.

## ANIMAL DISEASES

Progress has been noted in shipping fever tests. Bacterial cultures were made from the respiratory systems of 88 normal cattle and from 24 comparable cattle affected with shipping fever. It was determined that the genus *Pasteurella hemolytica* may be an important factor in the cause of shipping fever. Attempts to demonstrate virus in the respiratory systems of normal cattle and in cattle affected with shipping fever were unsuccessful.

Under field conditions, 1,200 cattle were used to determine the effect of continuous feeding of antibiotics on the incidence of liver abscesses. One lot received no antibiotic, while three other lots received varying amounts of aureomycin in the feed. Veterinary scientists found that animals which received aureomycin contained significantly fewer abscessed livers at the time of slaughter.

Hearts from 41 cattle affected with high

mountain disease were compared with hearts from 39 normal comparable cattle. The weight of the hearts from diseased cattle was significantly greater than for normal animals. The increased weight was localized in the right ventricle. Data from this and other tests show that in high mountain disease the primary change is increased resistance to pulmonary circulation and that healthy cattle residing at high altitudes develop a degree of higher resistance to pulmonary circulation.

Toxicity of pingue, a common weed of Colorado ranges, was studied. In experimental sheep the toxic dose in plant weight was 1 to 2 percent of the body weight of the sheep. The lethal oral dose in plant weight varied from 1 to 3 percent of the body weight of the sheep.

Four lots of ewes were used to determine the cause of vibriosis. It was determined that

*Vibrio fetus* is the full cause for vibronic abortion in sheep. Four vaccines were then tested. A single vaccine was administered to ewes of a single lot prior to breeding. The immunity of all animals was challenged dur-

ing the last month of gestation by feeding infected tissues. Vaccinated lots developed abortions at the same incidence as did the control lot. Thus, the vaccines failed to immunize against the challenge.

## CHEMISTRY AND ENDOCRINE STUDIES

Elberta peaches from a nitrogen test experiment were furnished by the Western Slope Branch Experiment Station for analysis. Low nitrogen fertilization was at the rate of 0.25 pound per tree, while high fertilization was at the rate of 3.5 pounds of nitrogen per tree. After arrival on the campus, the high nitrogen-treated peaches had to be held four days longer at 70 degrees F. for proper ripening prior to processing. Upon ripening, peaches in this group were definitely firmer in texture in both the canned and frozen products. They also were superior in flesh color and fruit flavor.

Because of the many requests for directions to prepare frozen peach topping in the home, the commercial type formula developed in previous years was modified to make it applicable for home use. Primary use of the mixture is as a fresh fruit topping for ice cream and shortcake. It also can be used as

a ready mix for making superior peach cobbler or similar products. When used in this manner no additional thickening is added.

Internal black spot of potatoes is frequently a serious problem to the potato industry since it lowers tuber quality and subsequent market value. With increased potato utilization in the form of prepared food products, the demand for potatoes free from blemishes and discolorations is becoming greater each year. Black spot is characterized by the presence of gray or black and sometimes grayish brown spots just beneath the skin. These are usually left exposed when potatoes are peeled. Although many factors induce black spot, a very important one is undoubtedly temperature. Experimentally bruised tubers held at 38 degrees F. developed black spot much more readily than did holding them at room temperature. Low storage temperatures make potatoes much more susceptible to bruising



*Over-ripe peaches can be utilized in the home to make a fresh flavored frozen peach topping.*

injury and subsequent black spot development. Proper temperature conditioning of the tubers prior to handling operations is indicated.

In tests with cooperating cattle feeders in Colorado and California, more than 40,000 head of feedlot steers and heifers have been treated with various long-acting, esterified steroids for improvement of rate of growth and fattening. The results continue to be highly satisfactory, showing that a single injection of either of three of these hormone combinations will bring about improvement

in daily gain equal to or better than that obtained with daily feeding of 10 mg. of stilbestrol. When both oral diethylstilbestrol and paste hormones are given, the effect of this combination on feedlot gain is greater than that obtained by either one separately, indicating an augmentative effect rather than an additive one. Of interest is the response of beef heifers to treatment with paste hormones given simultaneously with oral DES, since a remarkable increase in daily gain was obtained.

## INFORMATION AND PUBLICATIONS

Developments in agricultural research were brought before the public through news and feature stories and radio and television programs prepared by the Information Service.

News releases were distributed to all weekly and daily newspapers, press associations, farm magazines and radio stations in Colorado and neighboring states. Several news features were prepared for television broadcast.

The public was also kept informed of progress in research through the Experiment Station quarterly publication, "Colorado Farm and Home Research." This magazine is sent without charge to residents of the state who request it. Present circulation is about 3,800.

An additional function of the Information Service was to process for publication the technical papers and bulletins listed below.

### General Series Papers

- Amemiya, M. and Evans, N. "Soil and Water Relationships Under Irrigation (Grand Junction)." Gen. Series 669.
- Binkley, A. M. "Vacuum Cooling of Fresh Fruits and Vegetables." Gen. Series 689.
- Daniels, L. B. "Insect Pest Recommendations." Gen. Series 681.
- Daugherty, Ford and Hervey, Don. "1956 Range and Animal Nutrition Research." Gen. Series 670.
- Esplin, A. L. and Story, C. D. "Feeders Day 1958." Gen. Series 671.
- Foskett, R. L. and Hoerner, J. L. "Arkansas Valley Progress Report." Gen. Series 678.
- Franklin, W. T.; Whitney, R. S.; Code, W. E.; Reeve, R. C. "Reclamation and Management of Saline-Sodium Soils." Gen. Series 667.
- Fults, J.; Drage, C. M.; Beach, G. A. "Turf Grass Research." Gen. Series 685.
- Green, Ferris. "Western Slope Branch Station Report, 1957." Gen. Series 684.

- Hervey, Don. "Range Improvement, Great Divide Experimental Range." Gen. Series 688.
- Leonard, W.; Fauber, H.; Koonce, D. "Arkansas Valley Branch Station Progress Report." Gen. Series 672.
- Leonard, W. "Hybrid Corn Varieties." Gen. Series 680.
- Mann, Herb. "Southeastern Colorado Branch Station Report." Gen. Series 682.
- Paulson, W. H. "San Juan Basin Branch Station Report (crops), 1957." Gen. Series 686.
- Salisbury, F. "Steps Which Lead to the Formation of Flowers." Gen. Series 673.
- Stockwell, H. J. "Snow Survey, Feb. 1, 1958." Gen. Series 674.
- Stockwell, H. J. "Snow Survey, Mar. 1, 1958." Gen. Series 675.
- Stockwell, H. J. "Snow Survey, April 1, 1958." Gen. Series 676.
- Stockwell, H. J. "Snow Survey, May 1, 1958." Gen. Series 677.
- Stonaker, H. H. "Beef Cattle Research, San Juan Branch Station." Gen. Series 683.
- Terwilliger, C.; Jensen, R.; Joseph, E. "Analysis of Range Reseeding Results." Gen. Series 666.
- Thornton, Bruce. "Carbon Disulphide." Gen. Series 679.
- Willhite, Forrest. "Mountain Meadow Research, South Park." Gen. Series 687.
- Willhite, Forrest. "Improving Mountain Meadows." Gen. Series 665.

### Scientific Series Papers

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- Benjamin, M. and Lamb, Wm. "Haemobartonella Canis Infection in a Dog." Jour. Amer. Vet. Med. Assoc. Sci. Series 555.
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 Yeager, Lee E., Ph.D. Game Management (USDI)

## Financial Report for Year Ending June 30, 1958

### RECEIPTS 1957-1958

### DISBURSEMENTS OF FUNDS BY CLASSIFICATION FOR THE FISCAL YEAR ENDED JUNE 30, 1958

FUNDS	Balance June 1, 1957	Receipts from U.S. Treasurer	Receipts Other Sources	Total Income	Personal Services	Travel	Transporta- tion of Things	Communi- cation Service	Rents and Utility Service	Printing and Binding	Other Contractual Services	Supplies and Materials	Equipment	Miscellaneous and Other	Contributions to Retirement	Total Expendi- tures	Balance June 30, 1958	Grand Total
Hatch		302,297.00		302,297.00	230,858.68	8,785.57	601.41	1,018.23	3,370.08	2,150.92	5,731.49	27,967.68	13,495.04		8,317.90	302,297.00		302,297.00
RRF		145,620.00		145,620.00	90,798.22	3,398.95	259.62	846.52	2,676.58	70.02	3,743.11	22,518.76	18,908.29		2,399.93	145,620.00		145,620.00
RRF Trust		20,800.00		20,800.00	13,445.55	4,868.85	4.76	1,396.70		127.25	317.78	638.81				20,800.00		20,800.00
Title II Sec. 204 (b)	12.49	5,000.00		5,012.49	3,716.67	144.51		171.17		25.21	499.80	165.61	289.52			5,012.49		5,012.49
General Appropriation			367,545.66	367,545.66	274,434.61	4,977.42	1,400.63	2,732.25	8,808.10	6,605.38	10,139.25	30,558.63	13,095.23	3,913.27	10,880.89	367,545.66		367,545.66
Plant and Animal Disease			50,000.00	50,000.00	33,313.10	391.95	325.54	606.51	1,230.24	201.59	1,751.37	7,743.26	3,067.08	393.40	975.96	50,000.00		50,000.00
S.E. Colorado Branch Station			18,000.00	18,000.00	9,318.50	33.75	62.60	13.65	1,906.28	108.24	281.37	3,203.56	2,473.04		596.01	18,000.00		18,000.00
Pure Seed			8,000.00	8,000.00	7,678.99		16.28	34.45	29.16	49.83	18.23	56.42			116.64	8,000.00		8,000.00
Mountain Meadow (Agron.)			7,500.00	7,500.00	6,352.95	48.44		125.32	58.70		62.19	807.42			44.98	7,500.00		7,500.00
Mountain Meadow (Beef)			12,500.00	12,500.00	10,144.18	165.28	146.28	60.14	204.68		67.39	621.97	932.78		157.30	12,500.00		12,500.00
Control of Pocket Gophers			22,000.00	22,000.00	17,509.43	1,957.94	26.78	152.76	305.64	55.73	412.01	1,177.84	28.62		373.25	22,000.00		22,000.00
Mill Levy Tax	22,317.37		161,540.71	183,858.08	110,848.59	2,936.72	1,047.32	3,951.71	4,905.16	4,798.41	6,460.07	17,878.49	6,626.15	3,455.36	5,526.53	168,434.51	15,423.37	183,858.08
Vibrio Tax Fund	3,049.22		13,846.32	16,895.54	8,802.37	235.15	2.40	141.16	142.91	58.30	68.69	6,677.78	2.94		260.00	16,391.70	503.84	16,895.54
Station Special	3,824.33		261,244.90	265,069.23	46,590.00	13,741.66	1,077.90	972.29	20,104.87	860.49	13,934.02	91,555.11	30,306.16	39,735.41	695.85	259,573.76	5,495.47	265,069.23
Hybrid Corn	8,084.44		4,586.19	12,670.63	1,749.96	321.90	28.43	20.80	31.00		212.40	955.15				3,319.64	9,350.99	12,670.63
CSURF	116,437.38		141,166.14	257,603.52	62,347.04	3,340.19	445.36	1,113.34	4,453.66	1,336.00	4,008.17	18,926.78	10,465.18	2,560.68	2,338.01	111,334.41	146,269.11	257,603.52
<b>TOTALS</b>	153,725.23	473,717.00	1,067,929.92	1,695,372.15	927,909.14	45,348.28	5,445.31	13,375.00	48,227.06	16,447.37	47,710.34	231,453.27	99,690.03	50,058.12	32,683.25	1,518,329.37	177,042.78	1,695,372.15

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