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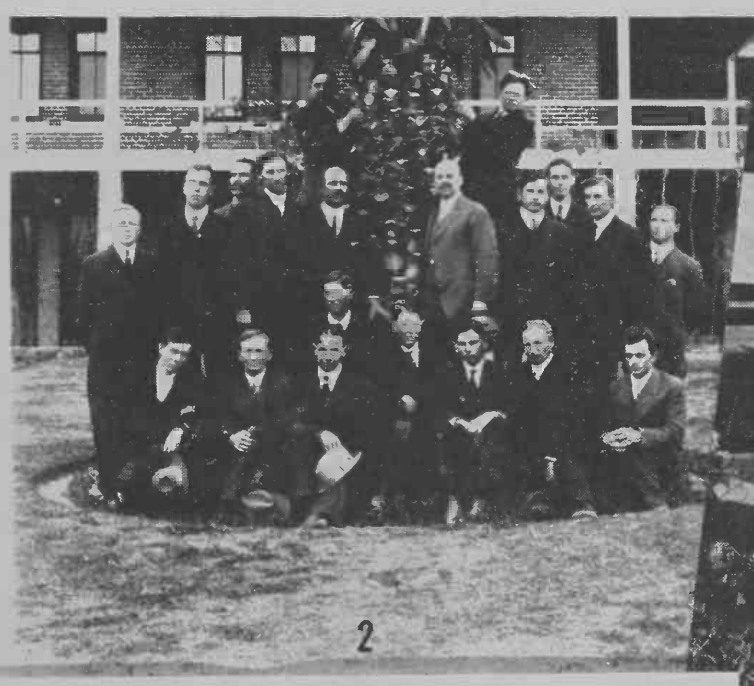

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UA Seventy-Fifth Anniversary

Memories of Many Years Ago

Honoring Those Who Have Served

Recently the College of Agriculture of the University of Arizona awarded copper medallions to a group of men and women who have contributed mightily to the agriculture of the state. These were awarded on the occasion of the Seventy-fifth Anniversary year of the University of Arizona.

To those of us in the College of Agriculture this anniversary is especially significant. It was in 1885 that a Territorial

Legislature established the University of Arizona. It was 1890 when three departments were established — Agriculture, Mines and Engineering, and the Agricultural Experiment Station. In 1891 the University was opened to students. In 1915 the Preparatory Department was closed and this University was reorganized into three colleges — Letters, Arts and Science; Mines and Engineering; Agriculture. The Bureau of Mines was also established then.

The copper medallion, paying tribute to alumni and others who have contributed to this University's greatness in teaching, research and service to the state, has great significance.

One face shows the torch of truth borne by a hand symbolic of the faculty. There is a relief map of the state to show that the University serves all the state, as the state's Land-Grant educational institution. A star on the map indicates the location of Tucson, and a mountain range represents the state's terrain.

The saguaro cactus, which bears Arizona's state flower, is shown on the reverse of the medallion. There is also a branch of the Phoenix palm, symbolizing triumph of knowledge over natural barriers. Between the cactus and the palm, the seal of the University of Arizona is placed. Each medallion, as bestowed, will carry the name of the recipient.

Agriculture, and this College of Agriculture, depends on two groups of men and women — those who in the past have built so strongly a foundation of research knowledge and educational practices, and those who will, in future years, reach into vastly wider realms of knowledge, learning and teaching in the greatest cause of humanity.

Harold E. Myers

Dean
College of Agriculture and
School of Home Economics

In This Issue

Trade names used in this magazine do not endorse products named nor imply criticism of similar ones not mentioned.

Aggie Scenes From Long Ago

Our cover picture in this issue actually is several pictures, old time pictures which it is nice to review at this time when the University of Arizona is celebrating its 75th anniversary and the Agricultural Experiment Station its 70th anniversary.

Here is the description of these scenes, as numbered in the cover layout:

1. The first UA livestock judging team to participate in intercollegiate competition, 1925. Reading left to right, Professor E. B. Stanley, Dr. John W. McInnes, Merle Mundhenke, Irwin Ingram, Orval A. Knox, Forrest W. Manley, Hiram J. Shouse.
2. Staff of the UA College of Agriculture in 1912 — A. E. Vinson, Biochemist; W. H. Lawrence, Horticulturist; A. L. Enger, Asst. Engineer; G. E. P. Smith, Irrigation Engineer; C. R. Fillerup, Farm Foreman; J. J. Thornber, Botanist; R. H. Forbes, Director, Experiment Station; Arthur H. Wilde, President, U of A;

   George F. Freeman, Plant Breeder; S. F. Morris, Director, Extension Service; F. W. Wilson, Animal Husbandman; C. N. Catlin, Asst. Chemist; C. E. Grassick, Secretary; Frank Simmons, Foreman, Date Orchard; C. J. Wood, Foreman, Experiment Farm; W. J. Flake, Foreman, Experiment Farm; F. G. McGuffin, Foreman, Tucson Farm; D. C. Aepli, Foreman, Experiment Farm; L. L. Bates, Foreman, Prescott Farm; J. C. T. Uphof, Plant Breeder.
3. Animal husbandry students, on a field trip judging Angora goats at the Aubrey Gist ranch near Skull Valley, 1919. Goat raising was a fairly flourishing business then. In later years it declined and today is of little economic importance in Arizona.
4. Students in Agriculture and Home Economics operating a Chuck Wagon stand at the Tucson Livestock Show, 1936, to raise funds for their stock judging teams.
5. Students enrolled in the range and livestock field course on tour of Arizona range areas, 1919.
6. Feeding yucca to drought-stricken range cattle in southern Arizona, 1918. Plants were cut with an ax, hauled to a central location and shredded or finely chopped with special machines. An emergency feed, chopped yucca kept cattle from starving during long drought periods.
7. A part of the ostrich flock on the University grounds, 1915. Ostrich raising at that time was engaged in to a limited extent by farmers in the Salt River Valley. The University acquired a flock of 14 birds for special studies. It was soon realized that ostriches would be of little or no importance, economically or otherwise, and the project was discontinued.

1959 Arizona Farm Income $414.4 Million

Raymond E. Seltzer

Cash receipts from farming and ranching in Arizona during 1959 totaled $414.4 million, below the record of 1958 but still substantially above the average for the previous 10 years.

Decreases in cotton prices, poor vegetable markets, and late-season declines in cattle prices were the major factors responsible for the lower income.

Income by commodities was as follows: cotton lint and cottonseed — $142 million; cattle and calves — $97 million; vegetables and melons — $63 million; dairy products — $27 million; feed grains — $15.3 million; hay — $19 million; citrus fruit — $7.2 million; sheep, lambs, and wool — $5 million; poultry and eggs — $5.2 million; seed crops — $4 million; miscellaneous crops — $14.6 million; miscellaneous livestock products — $2.5 million; and federal government payments — $2.6 million.

Agriculture is second only to manufacturing as a source of income to Arizona. In spite of rumors of the declining importance of agriculture, these data show that over the past fifteen years agriculture in Arizona has maintained its relative importance as a source of income to the state.

Over-Pumping Continues

Total usage of water for irrigation during 1959 was approximately 6.6 million acre-feet. Over-pumping of ground water reserves continued, and water tables continued to fall. Surface water supplies at the end of 1959 were the best in recent years as heavy rains added to stored water supplies and deep snows in northern Arizona promise more runoff to come.

Speculative sales of farm and ranch property are becoming of importance throughout the state as investors are purchasing acreage for long-term value appreciation. On January 1, 1960, leasing methods for state-owned agricultural lands were changed, with the new rental rates being based on productivity of land and availability of water, with bonus rents charged for land carrying a cotton allotment.

Dr. Seltzer is Head of the Department of Agricultural Economics.

Cotton Yields Rise Slightly

Cotton yields during 1959 averaged 942 pounds per acre, slightly above the 931 pounds in 1958 but well below the 1037 pounds in 1957 and the record of 1108 in 1956. Heavy insect damage late in the season, prolonged rains, and excessive humidity all contributed to lower yields.

Growers were offered a choice between Plan "A" (regular acreage allotment and 80 per cent supports) or Plan "B" (increase of 40% in acreage over regular allotments and 65 per cent supports). A total of 24 percent of Arizona's cotton farms elected Plan "B", resulting in an increase of 32,186 acres over normal allotments. The pink bollworm infestation was apparently successfully controlled, although control measures will continue through 1960.

Costs of production of cotton continue to rise. Estimated per acre costs for producing, harvesting, and ginning upland cotton during 1960 are as follows: Salt River Project — $186.72; 200-foot lift areas — $205.22; and 350-foot pump lift areas — $229.22.

Acreage, yield, and production of all hay increased during 1959. Hay prices held up well during the summer and rose sharply in the late fall. Costs of producing, harvesting, baling and hauling hay continue to rise and for 1960 per-acre costs are estimated for a five-ton yield as follows: Salt River Valley — $102.30; 200-foot pump lift areas — $122.02; and 300-foot lift areas — $142.38 per acre. Although alfalfa production appears unprofitable in deep lift areas, many farmers, faced with declining cotton yields, are becoming convinced of the profitability of including alfalfa in a sound rotation program.

More Feed Grains

Production of feed grains in Arizona increased during 1959 as both acreage and yields were up. Use of hybrid sorghums and mixed plantings for silage are resulting in substantial yield increases for this crop. As was true for other crops, per acre costs of producing and harvesting feed grains are expected to be higher in 1960, ranging from $52.85 to $75.60 for barley, and $60.47 to $90.47 for grain sorghum.

Vegetable production continued to shift to newer areas in the state. Both the acreage and volume of production were larger than the previous year but low prices, resulting from an excess of supply in relation to demand, resulted in disastrously low returns.

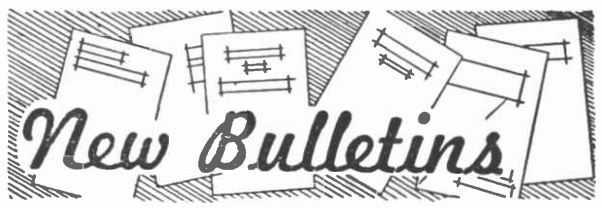
Returns to citrus growers for the 1958-59 crop were lower than the record returns of the previous year, but in general the season was a good one.

A late season price break in beef cattle resulted in price declines of 5 to 6 cents per pound for slaughter animals and a decline of 6 to 8 cents occurred in stocker and feeder steers and calves. Record numbers of cattle were on feed during most of the year, with the number on Jan. 1, 1960, being 265,000. Beef cattle numbers in the U.S. are still increasing and 102 million head are predicted for 1960. Good range conditions and abundant feed will help offset lower cattle prices in 1960.

Milk Surplus A Problem

Production of milk in Arizona continued to increase and surpluses over fluid milk demand are beginning to present a problem. Although milk prices held up well early in the year they declined rapidly in late fall months.

The poultry industry, too, continued to expand, but prices were generally low. Egg production in Arizona still lags behind consumption and more than half of our eggs must be shipped in from out-of-state.



These new U of A publications are available at your county agent's office. Phone or write your agent for a copy.

Circulars

142, Rev.—"The Care and Simple Repair of Household Equipment"

276—"Let's Eat Vegetables Every Day"

277—"What the New Fiber Labels Mean to You"

Folder

84—"Just What Is the Cooperative Extension Service"

Bulletins

A-1—"Chemical Weed Control Recommendations"

A-2—"Cotton Insect Control"

A-3—"Arizona Agriculture, 1960"

296, Rev.—"Control and Identification of Crop Weeds in Southern Arizona"

Special Report

4—"Arizona Fertilizer Recommendations for Agronomic and Commercial Horticultural Crops in Arizona, 1960"

Reports

187—"Small Grains Variety Tests, 1959"

188—"Cantaloup Research in Arizona, Summary for 1959"

189—"Lettuce Research in Arizona, Summary for 1959"

For Keeping Beef Cattle Cool

HIGH FIBER VERSUS LOW FIBER ALFALFA

Bruce Taylor, E. S. Erwin, Farris Hubbert, Jr. and John Kuhn

COUNTRY LIFE MEET SLATED FOR JUNE 6-9

The 14th annual Town & Country Life Conference will be June 6 to 9 on the University of Arizona campus, says Miss Jean Stewart, state leader of Home Economics Extension. Meetings will be in the Student Union, while participants will be lodged in campus dormitories. Those planning to attend should make reservations through their county agent's office before May 16.

Extremely hot weather is known to depress animal performance when the air temperature consistently exceeds the temperature beyond which higher than normal body temperatures occur (critical temperature). Research work has shown that the depressive effects of heat begin to be felt by domestic cattle in the relatively low range of 75° to 80° F.

Ruminants, such as beef cattle, were designed with a built-in fermentation vat, the rumen, where the billions of microorganisms generate considerable waste heat in their efforts to break down fibrous feeds. Thus the fattening beef animal must contend not only with the environmental heat, but also the waste heat generated in the digestion process. This heat must be dissipated if the animal's body temperature is to remain in a safe, productive range.

The beneficial influence of shade to ward off the direct sun rays has previously been reported (PROGRESSIVE AGRICULTURE, Winter 1959). Other helpful management practices, such as constructing wire or cable corrals to facilitate maximum air movement and reduce heat radiation, or making a special effort to provide cool water, can contribute toward increased animal performance in our Arizona feedlots.

Reducing Heat In Rumen

Another worthwhile approach to the problem of increasing hot weather performance of fattening beef cattle is to reduce the excess heat produced in the rumen. The animals themselves will do this to some extent by reducing their feed consumption as air temperatures climb. Providing adequate required protein and phosphorus is also important in holding excess heat production in the rumen to a minimum.

Results of a 109-day feedlot trial conducted from June 17 through October 4, 1959, at the Yuma-Mesa Experiment Station, are summarized in our table. Eighty yearling steers of mixed breeding were allotted into 10 pens of 8 animals each. This work was done primarily to determine if feeding early-cut (pre-bloom) alfalfa would result in more rapid and efficient feedlot gains than late-cut (full-bloom) alfalfa when fed as the roughage in a growing-fattening feedlot ration.

Earlier Cut Means Less Heat

The lower crude fiber content of the early-cut hay is associated with less waste heat production in the rumen. This contributes toward our goal of reducing the heat load of the animals. There are, of course, other desirable nutrients associated with immature forage that add to the value of the pre-bloom alfalfa.

Only 0.9 pound of ground barley was fed per 100 pounds of body weight per animal each day. Stabilized tallow or hydrolyzed vegetable oil was substituted for barley at the rate of 0.75 pound per day where used.

Pre-bloom (low fiber) and full-bloom (high fiber) alfalfa hay were chopped and fed so the cattle seldom were out of feed.

The early-cut (lower fiber) alfalfa hay saved $1.36 as compared to late-cut (higher fiber) alfalfa in producing 100 pounds of gain on beef steers fed in the summer months in the Yuma area and with the feed prices used in the table.

The late-cut (higher fiber) alfalfa proved to be worth 85 percent as much as the early-cut (lower fiber) alfalfa in this experiment. This means that if the early-cut hay is valued at $30 per ton, the late-cut is worth $4.40 per ton less or $25.60.

Fat Increased Summer Gains

The addition of vegetable fat to the early-cut hay increased summer gains by 0.32 pound per steer daily or 16.6 percent. The same fat added to a ration of late-cut hay increased gains by 0.29 pound or 15.9 percent. Each dollar spent for such fat, and fed with pre-bloom hay, saved $1.18 in the alfalfa and barley required per 100 pounds of gain.

Stabilized tallow used only with the early-cut hay, produced slightly, but not significantly, less gain per steer than the hyrolyzed vegetable fat. The values of the two types of fat were similar.

The gains made in this summer trial with a low level of concentrates are both satisfactory and economical. The cattle were graded as fleshy feeders at the termination of the trial after having consumed 700 pounds of concentrates per steer. An additional 60 days on a higher concentrate ration would have produced choice fat steers.

Summary of results of growing-fattening study conducted at the Yuma-Mesa Experiment Station (June 17 - October 4, 1959)

	Pre-bloom alfalfa hay[1]			Full-bloom alfalfa hay[2]	
	Control	Hyd. Veg. Fat	Tallow	Control	Hyd. Veg. Fat
Number of steers	16	16	16	16	16
Av. initial weight, lb.	664	680	668	660	666
Agv. daily gain, lb.	1.93	2.25	2.19	1.82	2.11
Avg. daily feed consumed, lb.:					
Alfalfa hay	12.03	12.40	12.38	12.59	12.64
Barley	6.77	6.26	6.12	6.74	6.27
Fat	—	.75	.75	—	.75
Feed per 100 lb. gain, lb.	974	862	879	1062	933
Feed cost per 100 lb. gain, $	18.12	17.56	17.86	19.64	18.87

[1]Pre-bloom alfalfa contained 22.8% crude fiber.
[2]Full-bloom alfalfa contained 29.8% crude fiber.
Feed prices used: alfalfa hay, $30 per ton; barley, $50 per ton; fat, $140 per ton.

Dr. Taylor is Head of the Department of Animal Science; Dr. Erwin is a former Assistant Animal Scientist; Dr. Hubbert is Assistant Animal Scientist, and Mr. Kuhn is an Assistant in Animal Science.

A Changing World Is Your Challenge

Home Economists Are Told

"Meeting the changes of today through education and service, broadly based on unselfish ideals and on knowledge gained through research — this, in brief, is the task of home economics."

So said Dr. Olga P. Brucher, president of the American Home Economics Association, at the dedication of the University of Arizona's new Home Economics building Feb. 6, 1960. During a two-day dedication a constant parade of visitors streamed through the new building, admiring its facilities. Special luncheons and dinners were held for various groups of professional and lay home economists.

Key words for the home economist of this modern day, said Dr. Brucher, are "change," "education," and "service." Pointing to a worldwide revolution — technological, social, educational and economic — the national home economics leader named five items of change confronting the world:

New Nations Arising

(1) For decades, the Western, or so-called Christian nations have dominated the globe politically. Since World War II, however, the continuing revolt against Western colonialism has created 24 new nations — comprising nearly a quarter of the world's population, and more are being created.

(2) Peoples around the world are striving to improve their standards of living. You must remember that two-thirds of the world's people exist on a per capita income so low it is difficult for us to comprehend how they survive.

(3) Throughout the world today there is a great hunger for education, a revolt against ignorance and illiteracy. Governments are unable to build schools fast enough or educate enough teachers to supply the demand.

Dangerous New Doctrines

(4) The independence of many nations is threatened by new forms of political and economic organizations aimed at the destruction of all traditional and dearly-won freedom.

(5) There is a great change in established value systems. Far less potent than formerly in creating and maintaining value systems is the influence of the tribe, the family, the local community, and even the church. Old standards are being discarded and, in many instances, new standards have not yet developed. This change constitutes one of the great social revolutions of our day.

"Other changes that immediately affect homes and families include the population explosion in our own country and around the world . . . new concepts of the education of women and of the role of women in society . . . technological advances that may, or may not, make life simpler for the homemaker . . . problems imposed by our rapidly expanding older group . . . and the complex changes imposed by a people constantly on the move.

Changes In Living Customs

"The social changes affecting family living patterns include the multiple wage-earning family, in which the wife, and perhaps some of the children, are working outside the home. The mobile family — or the family on wheels — which lives in a trailer and moves about the country as the father's job takes him from place to place.

"In addition, there are problems arising from the needs of various age levels within the family, and the needs of family members who have different occupations.

"Human problems are, of course, as many and varied as human beings themselves. I cite these few merely to indicate a major objective for home economics: a rededication of our profession to a search for fundamentals . . . with the wisdom not to over-emphasize a present which we know will soon be an obsolete past," said Dr. Brucher.

APRIL

5- 7—Extension Service Directors' Spring Meeting
6-10—Yuma County Fair
22-23—FHA State Convention, U of A Campus
29-30—Pinal County Fair

Federated Ag Clubs Pick 1960-61 Officers

The Agricultural Council of the University of Arizona has recently elected its officers for 1960-61.

They are Jon E. Peek, Claremont, Calif., president; Stuart L. Anderson, Peoria, Ariz., vice-president; John J. Murphy, Tucson, secretary; Dan W. Clarke, Tucson, treasurer; and Ronald O. Wolhart, Tucson, public relations chairman. Faculty adviser to the council is Dr. Robert H. Maier of the UA agricultural chemistry and soils department.

The Agricultural Council consists of representatives from the various clubs and organizations in the College of Agriculture and School of Home Economics. Included are the Range Management Club; Alpha Omicron, home economics sorority; Crops and Soils Club; the 4-H Club; Block and Bridle Club; the Home Economics Club; the Entomology Club; the Aggie House; Alpha Gamma Rho, agriculture fraternity; Alpha Zeta, honorary agriculture fraternity; and Alpha Tau Alpha, agricultural education fraternity.

The council, similar to a high school student council, serves to unify the various agricultural and home economics clubs and organizations, and to act as a contact between the administration and the student body in the College of Agriculture.

MAY

6—4th Annual Poultry Field Day, Poultry Research Center, U of A, Tucson
13—Spring Field Day, Mesa Branch Station
20—Annual Safford Field Day, Safford
20—Vegetable Commodity Field Day, Yuma
21—Cattle Feeders' Day, Campbell Ave. Farm & Casa Grande Highway Farm, Tucson
22—National Rural Life Sunday

JUNE

6- 9—Town & Country Life Conference, U of A Campus
6-11—Annual 4-H Camp YUCOSA

AUGUST

1- 5—4-H Roundup, U of A Campus
8-12—Annual Future Farmers Leadership Training Conference, U of A Campus

SHADES OF grandpaw's milk stool! Old Brindle and Muley never dreamed, nor did their owners, that some day dairy records would be processed in an efficient electric computing center such as this, where cards record not only milk production and butterfat test but also breeding dates, date of calving and other pertinent bovine history.

Pushed By Extension Service

DHIA Records Help Dairymen

W. R. Van Sant

The purpose of the Dairy Herd Improvement Association program is to provide dairymen information that they can use to improve herd efficiency. Records of production enable the dairymen to cull the least profitable cows, to feed the rest according to their production requirements, and to select the most suitable animals for replacement.

The Dairy Herd Improvement program started in Arizona in 1916 but during the past 10 years has had its greatest growth.

As of January 1, 1960, dairymen were participating as follows:

Standard DHIA Program
Manual calculated records — 21,261 cows in 176 herds
IBM calculated records — 4,690 cows in 52 herds

Owner-Sampler Program
Manual calculated records — 66 cows in 1 herd
IBM calculated records — 242 cows in 2 herds

Total On Test
26,259 cows in 231 herds

New Method of Record Keeping

Processing of DHIA records by the use of IBM in central processing centers is a new procedure. In Arizona the first herd to start on this program was the University of Arizona dairy herd, beginning in October of 1956. As of January 1, 1960, there were 4,932 cows in 54 herds in this program. It is anticipated that within the next three to five years all DHIA records will be processed in these electronic computing centers.

In 1959 the DHIA program in Arizona had an average of 24,172 cows in 222 herds on test each month. There were 22,007 cow years reported in 198 herds with an average production of 10,658 pounds of milk and 394 pounds of butterfat per cow year.

Herd Size Growing

The average size of Arizona herds continues to increase. In 1959 it averaged 124 cow years per herd. There were 89 herds with an average production of 400 pounds of butterfat and over. This is 44.9% of the total herds reported. The high herd for the year of 201 cow years had an average of 14,549 pounds of milk and 515 pounds of butterfat. There were three cows which produced over 1,000 pounds of butterfat. Compared to the rest of the nation, as of January 1, 1959, Arizona was:

1. First in percentage of total dairy cow population on test, 46.1%.
2. Third in average size per herd with 105.9 cows.
3. Tenth in average milk for D.H.I.A. herds in 1958.
4. Twenty-fifth in average fat per cow in D.H.I.A. herds.
5. Of all dairy cows in Arizona in 1959, this state was second in average milk production.
6. Twenty-second in total number of cows on D.H.I.A. test.
7. Forty-third among the states in total cow population.

Production 2nd In Nation

In Arizona the average production per cow of 8,730 pounds of milk containing 310 pounds of butterfat is exceeded only by California. The disparity between high production and low dairy cow numbers is accounted for by two facts.. Arizona dairying must compete with highly efficient irrigated cotton production, and high summer temperatures in Arizona require special attentions, such as shades and cooling devices, for high producing dairy animals. Thus dairying is limited, except in time of seasonal surplus, to production for the state's fluid milk needs.

As of Jan. 1, 1960, there were 26,259 dairy cows on DHIA test, largely from the Maricopa county milkshed. By counties, the number above is divided as follows: Maricopa—21,305; Pinal—1,375; Pima — 1,328; Graham — 954; Cochise — 521; Greenlee — 340; Yavapai — 239; Yuma — 197.

Mr. Van Sant is Extension Dairy Specialist.

Progressive Agriculture IN ARIZONA

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April, May, June, 1960

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Arizona farmers, ranchmen and homemakers may have their names placed on the mailing list to receive **Progressive Agriculture** at no cost by sending a request to the College of Agriculture, University of Arizona, Tucson, Arizona.

Early Setting of Squares Means Higher Cotton Yields

Early setting of squares resulted in higher yields and shorter plants, better suited for mechanical harvesting. The data, although based on a one-year study, indicate the importance of early insect control and other cultural practices which promote early setting of squares.

G. P. Wene, L. W. Sheets and R. E. Briggs

How many times have you heard the statements: "No use controlling cotton insects during July because the plant will set enough squares during August to make a good crop" or "Why bother setting an early crop because the plant will only shed it during the latter part of July?" Such opinions have been around so long that many cotton growers actually consider these statements as facts. An experiment was conducted in 1959 at the University of Arizona Cotton Research Center near Phoenix to determine the value of early square setting.

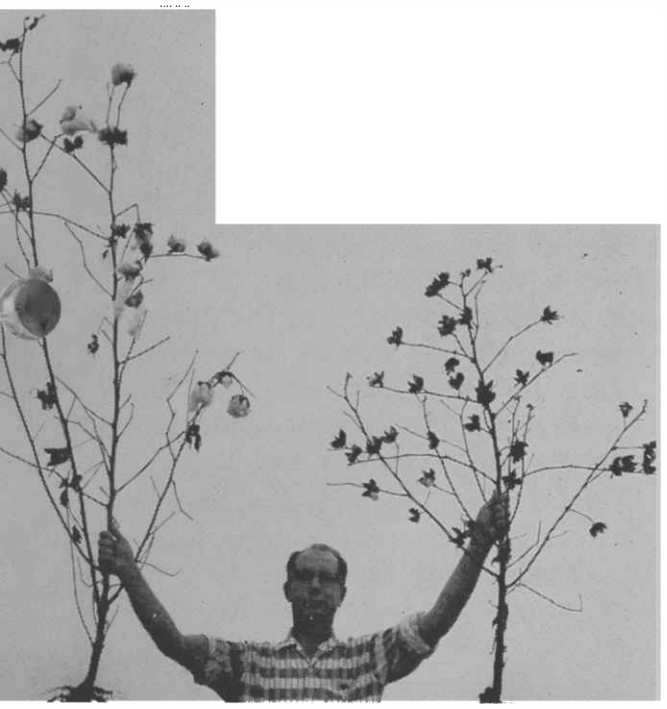
Dr. Wene is a University of Arizona Entomologist and Mr. Sheets a U.S. Department of Agriculture Cooperator, both at the Cotton Research Center. Dr. Briggs is Assistant Agronomist.

A block of Acala 44-WR cotton was dusted with standard insecticides at weekly intervals to keep destructive insects at a low level. This block was divided into 20 small plots, each consisting of five 25-foot rows spaced 40 inches apart with approximately six feet between plots. The treatments were:

1. **Check — no squares removed**
2. **Squares removed until June 15**
3. **Squares removed until July 1**
4. **Squares removed until July 15**
5. **Squares removed until August 1**

Each treatment was replicated four times. Squares were pulled from each plant twice a week and the number was recorded. Care was taken to pull off each square before it had become the size of a match head, in order to simulate lygus bug injury. Plant heights were measured at four dates and yields were obtained from three pickings.

On an acre basis, 81,748 squares were removed from the plots with squares removed until June 15. From the plots which were kept square-free until August first, 1,794,792 squares per acre were removed.



DELAYED FRUITING resulted in lower yield and a less desirable plant type, as shown by the plant on the left which had ←— all squares removed until August 1. The shorter, more desirable, plant on the right had no squares removed after July 1.

Lint Yield Reduced

As squaring was delayed, total lint yield was reduced as shown in Table 1. Prevention of fruiting by square removal until August first reduced the yield of cotton 16 percent. Furthermore, with treatments one through four, the bulk of the cotton was ready for harvesting by November 11. Yields of the late fruiting cotton were probably higher than normal in 1959 because the first killing frost did not occur until December. The data indicate the importance of insect control to prevent the loss of squares by lygus bugs and other insects especially during the month of July.

Table 1. Lint yield as influenced by delayed square setting

Treatment	Squares removed until	1st Pick Sept. 24	2nd Pick Nov. 11	3rd Pick Jan. 5	Total lint yield lbs.	% check
		lbs.	lbs.	lbs.		
1	Check*	716	700	224	1640	100
2	June 15	779	586	212	1577	96
3	July 1	682	693	175	1550	95
4	July 15	243	1051	109	1403	86
5	Aug. 1	0	688	687	1375	84

*No squares removed.

Plant Height Affected

Plant heights were influenced by delayed square setting as shown in Table 2. In general, when fruiting was delayed by square removal, plant height increased. At the time of the first picking, the plants in treatments one, two and three had good, erect growth which would be well suited for mechanical harvesting. In treatment five, where squares were removed until August first. the plants were tall with considerable vegetative growth and with bolls high on the plant.

These conditions usually result in lodging, which is especially serious since boll rots may increase and harvesting is more difficult. The plants in treatment four were intermediate in their growth habit between plants in the first three treatments and treatment five.

Table 2. Average height of cotton plants on four dates as influenced by delayed square setting

Treatment	Squares removed until	June 8	June 23	Aug. 7	Sept. 4
		inches	inches	inches	inches
1	Check*	10.4	34.8	39.7	46.5
2	June 15	10.2	35.8	40.4	46.1
3	July 1	10.6	37.9	44.5	51.3
4	July 15	10.6	37.0	48.6	56.5
5	Aug. 1	10.3	36.7	45.0	61.8

*No squares removed.

Location, Environment, Important In Determining

YOUR COTTON YIELDS

E. H. Pressley

On pages 8 and 9 of the last number of PROGRESSIVE AGRICULTURE, Winter 1960, appear articles written by Warner D. Fisher of the Plant Breeding Department and Lloyd L. Patterson of the Agronomy Department concerning variations in cotton in 1957 and 1958 due to environment.

Lint yields in Arizona were comparatively low in 1959, as they were in 1958. There were many complaints regarding small bolls, low lint percentage and varieties in general. Many of these complaints ended with the flat statement that the varieties have "run out." Very seldom were any other factors considered. The following facts are given regarding the 1959 crop.

Same Seed, Many Sites

Tests of the seven strains of Acala 44 WR which constitute the variety were grown at the University of Arizona's branch stations at Yuma, the Cotton Research Center, Marana and Safford. Breeder, foundation and registered seed of 44 WR were included in each test as checks. Each test thus contained 10 entries and each entry was replicated six times. A sample of 25 bolls was taken from each plot at each location, making a total of 60 samples per location. Sampling was done when from 50% to 60% of the crop was open.

Table 1 shows the laboratory results — each figure at each location being the mean of 60 determinations.

Remember that the seed of a given entry for all four locations was taken from the same bag. There could have been no genetic differences in the seed planted at the different locations, so any differences in yield and fiber properties were due to environment.

Attention is called to a few of the differences found in Table 1. Yield at the various locations needs no discussion. The number of bolls per pound of seed cotton differ greatly at the Cotton Center and Safford. When lint per cent and boll size are considered together, the difference is more pronounced in that 50 more bolls were required for a pound of lint at the Cotton Center than at Safford. Carrying the calculations one step further shows that two more bolls per linear foot of row were required for a bale per acre at the Cotton Center than at Safford.

Location Variations

The percentage of lint was much lower at the Cotton Center than at any other location — 4.3% less than at Safford. The lint index which is the weight in grams of lint from 100 seeds was very uniform at Yuma, the Cotton Center, and Marana, but much higher at Safford. On the other hand, the seed index which is the weight in grams of 100 seeds, was much higher at the Cotton Center than at the other locations.

One other difference in locations was very pronounced — number of seeds per boll. The average at the Cotton Center was 29.8. There were 34.6 seeds per boll at Yuma, 35.2 at Marana and 35.6 at Safford. The small number of seeds per boll at the Cotton Center was largely responsible for the small boll size. The extra large seed at this location accompanied by no more than an average amount of lint per seed was responsible for the low lint percentage.

Results from other commercial varieties, as well as from 60 new strains grown at Yuma, the Cotton Center, and Marana followed the same general pattern. Bolls from the plots at the Cotton Center were smaller, seeds fewer and larger, and the percentage of lint lower than those from the other locations.

Not Due to Crop Management

While it is safe to assume that the small number of seeds per boll was largely responsible for small boll size at the Cotton Center, we have no explanation for the low seed number. The crop was grown under good conditions as indicated by yields ranging from 2.3 to 3 bales per acre. At no time during the growing season was there any evidence of a lack of moisture or nitrogen. The field was planted to cotton in 1958 following the plowing under of two crops of green organic matter. Water penetration was excellent throughout the season.

Incomplete development of the embryos would explain the low number of seeds per boll, but at present we have no logical explanation as to why embryo development should have been poorer at the Cotton Center than at the other locations. It cannot be attributed to high temperatures, for those at Yuma were even higher. Close observations made each week showed normal flowers and an abundant shed of pollen. Insects were not responsible because they were well controlled.

Second picking samples were not taken from the 44 WR entries at the various locations. However, samples were taken at the Cotton Center from early and late pickings of an A-44 strain test including 25 entries replicated six times. Thus each figure in Table 2 is the mean of 150 samples. Attention is called to the differences between pickings. Results from the first picking followed the pattern set by the 44 WR strains. Bolls were small, lint per cent low, and seeds few and large.

Temperature and humidity records are available at each of the four locations. An attempt will be made to correlate these records with the results obtained from the cotton samples.

The information in this article is presented solely for the purpose of showing how much variation may occur within a variety when it is grown from the same seed source but under differing environmental conditions. The fact that many of these variations cannot be explained from our present knowledge indicates the need for more basic research in cotton.

TABLE 1 — ACALA 44 WR

Location	Bolls per lb of S.C.	Bolls per lb. of Lint	Per Cent Lint	Lint Index	Seed Index	Seeds per Boll	Lint per Acre
YUMA	63	175	36.0	7.5	13.3	34.6	1610
C. R. C.	69	207	33.2	7.4	14.9	29.8	1139
MARANA	62	178	35.0	7.3	13.6	35.2	867
SAFFORD	59	157	37.5	8.2	13.5	35.6	1223

TABLE 2 — A-44

Picking	Bolls per lb of S.C.	Bolls per lb of Lint	Per Cent Lint	Lint Index	Seed Index	Seeds per Boll
First	67	191	35.0	8.2	15.3	28.8
Second	59	158	37.2	8.1	13.7	35.1

Dr. Pressley is Head of the Plant Breeding Department.

SALT CEDAR CONTROL

K. R. Frost, Jr. and
K. C. Hamilton

Salt cedar (*Tamarix pentandra*), a native to the Mediterranean region, has become a problem in the Southwest. Why is salt cedar a problem?

(1) Its aggressive spreading along streambeds and the flood plains creates dense stands that are a flood hazard.

(2) It is a phreatophyte, or water-loving plant, that wastes large quantities of water. Salt cedar problem areas in Arizona, such as the lower Salt River, lower and upper Gila River, and lower Colorado River bottoms, are almost jungle-like in appearance. Salt cedar is appreciated by sportsmen for its dense thickets which furnish a habitat for wildlife, such as doves and rabbits. Its usefulness for soil erosion control or for wood and pulp products is extremely limited.

BEFORE AND AFTER — The picture at top shows salt cedar plants growing on a study area along the Gila River before plant removal was begun in 1958. Below that view is one of the same area, showing salt cedar regrowth one year after removal.

Problem Noted By Government

In the past fifteen years the salt cedar problem has aroused the interest of both state and federal agencies interested in irrigation and flood control. Several programs of salt cedar control by mechanical methods have been undertaken along southwestern rivers.

In 1958 the Bureau of Reclamation and the United States Army Corps of Engineers contracted with the University of Arizona to study the salt cedar problem. In the initial study, a University of Arizona graduate student was to observe the salt cedar clearing operations undertaken by the Wellton-Mohawk Irrigation and Drainage District on the Gila River.

The clearing operation involved removal of salt cedar from a 55-mile by 400-foot strip along the Gila river bed to reduce the danger of flooding. Crawler-type tractors with dozer blades and 10-foot rear-mounted undercutting blades were used to cut the salt cedar crown and roots 30 inches below the soil surface. Tractors with front-mounted rakes then piled the debris, which was later burned.

Mr. Frost is a Research Assistant, and Dr. Hamilton an Associate Agronomist, in the Agronomy Department.

The cost of clearing, the effectiveness of mechanical clearing, and the succession of new vegetation into the cleared area were the main topics studied. The relationship between the removal of salt cedar and the level of the groundwater was also investigated.

Cost Is Considerable

Costs per acre for undercutting salt cedar ranged from $6 to $30 per acre, depending on the amount of vegetation present. Costs per acre ranged from $7 to $16 per acre for raking and stacking salt cedar debris.

In 1959, one year after the clearing operation, regrowth counts showed a 92 percent reduction in the vegetative cover of salt cedar. Most regrowth occurred from disturbed salt cedar crowns left in the soil. Undercutting, 30 inches below the soil surface, with the complete removal of the crowns resulted in a minimum of regrowth. If a disturbed portion or a whole crown remained in the soil its chances for survival were much better when a high (four feet or less from the soil surface) water table was present.

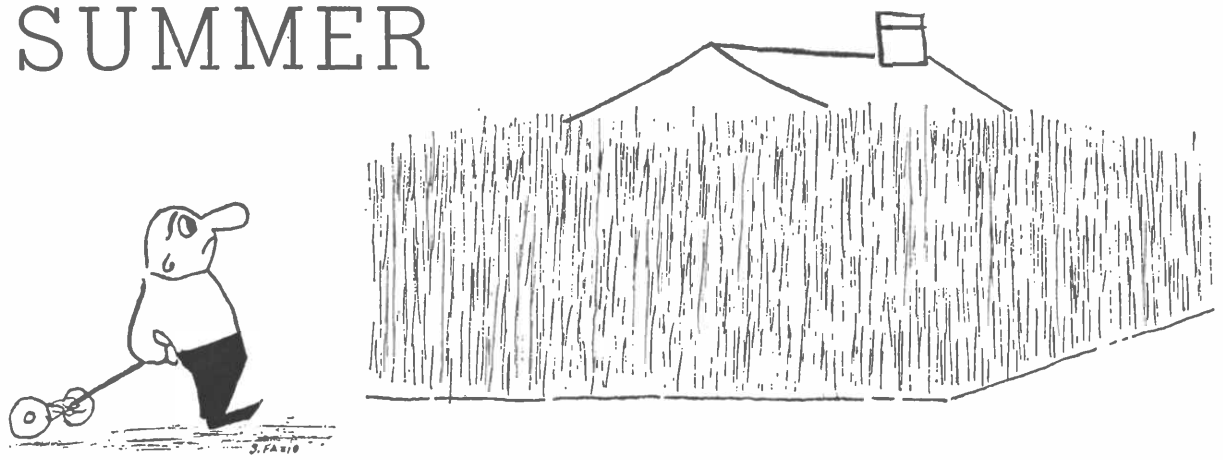
There was no reinfestation of the area by any woody or brushy species other than salt cedar or arrowweed. These plants were the most abundant before the clearing operation. Surface water and a high water table in some areas produced a large amount of salt cedar seedlings. Annual weeds pioneered in a few areas after rainfall and river flow.

No Effect On Water Table

In the first year after salt cedar removal the groundwater level rose three to five feet in the cleared area; however, the water level also rose in the adjacent areas. There was no indication that limited removal of salt cedar contributed to the rise in groundwater.

Satisfactory control of salt cedar was obtained throughout most of the cleared channel. However, adequate maintenance measures on regrowth must be carried out to retain this control. Maintenance by mechanical methods, such as undercutting

SUMMER



LAWN CARE

Steve Fazio

"Regardless of the lawn you start with, you will eventually end up with Bermuda." Many long time residents of Arizona have adopted this slogan in connection with the growing of summer lawns. The humor associated with this statement has considerable merit in view of our growing conditions and our experience with cool season grasses in southern Arizona.

Bermuda grass was introduced into the United States from India many years ago. It eventually found its way to the Southwest, where it became one of the best adapted grasses. Bermuda is a warm season grass and will go into a dormant condition during frost periods and prolonged drought. Its ability to grow under conditions of temperature extremes, high daytime and low night time temperatures, makes it difficult for other grasses or lawn covers to compete if Bermuda grass has infested the seedbeds.

Can Take Abuse

Bermuda grass withstands considerable abuse and is able to survive under conditions of heavy traffic, lack of water and fertilizer, and improper mowing. This ability to grow under neglect is responsible for the fact that many Bermuda lawns are not attractive. Bermuda grass can be an attractive green lawn if given the care that one devotes to other lawn varities.

Poor performance of Bermuda is due to poor management practices. These include watering, fertilizing, mowing and weed control. Bermuda grass is a deep-rooted plant and can draw on moisture from the lower depths of the soil profile. Under good soil conditions, Bermuda roots will extend to depths of four to five feet.

Frequent shallow watering will not supply sufficient moisture to wet the soil at the lower depths to encourage deeper root penetration. Bermuda lawns that have not been watered to the lower depths will show signs of wilting in a very short period of time in contrast to those that were watered to a greater soil depth.

Water Thoroughly, Evenly

Uneven watering will have a telltale effect on any lawn and can create serious problems if the condition is not remedied. Make sure that the entire lawn surface has been watered and that no dry spots are occurring. Dry spots are often encountered with stationary sprinkler systems, if the heads are located improperly or if the water pressure drops to a low level.

Moisture stress in Bermuda lawns can be detected by observing the color of the foliage. A change of color from brilliant green to a blue green is an advance warning that the grass is beginning to stress for water and an application should be made immediately.

Fertilization of Bermuda grass at rather frequent intervals is necessary since it is a heavy nitrogen feeder. The feeding of Bermuda begins during the latter part of October. just prior to the frost season. The second application is applied in early spring, just prior to emergence of new growth. Additional applications are made if the grass begins to show signs of going "off color" during the summer months.

Avoid Fertilizer 'Burning'

Ammonium sulfate is generally used as the source of nitrogen and is applied at the rate of one pound per 100 square feet of lawn surface. Burning can occur if the fertilizer is applied on a wet leaf surface. Make sure that the leaves are dry before broadcasting this material.

Mowing can cause severe setbacks in Bermuda lawns if it is not done at frequent intervals. Bermuda grows rapidly during warm weather and the leaves form a canopy of shade over the lower portion of the plants. The growth in the shady area becomes soft and tender and is subject to sunburning shortly after the top is mowed. Frequent mowing prevents this shading effect and the incidence of sunburning is eliminated or reduced. The frequency of mowing depends upon the growth of the grass, so no one rule can apply to all lawns. The grass should be mowed each time it grows one inch after a mowing and this may vary from every two to three days to longer periods. The clippings should be removed to prevent molding if they are over half an inch in length.

Flat growing weeds form shade over Bermuda lawns and cause the grass to die out if such weeds are not eradicated. Weeds can be avoided by proper fertilization, watering and mowing. If weeds are present in a Bermuda lawn, many of these can be eliminated by using chemical weed killers. Care should be exercised in using these chemicals since they are harmful to broadleaf plants including trees. Such chemicals should be applied according to direction and on windless days to prevent any possibility of wind drift.

Mr. Fazio is an Assistant Professor in the Department of Horticulture.

(continued from previous page)

or brush cutting, might be used in limited areas. However, mechanical maintenance measures would be impractical in places with surface water or a high water table.

A herbicide might be used to control regrowth if applied at the correct time and with the right wind conditions to avoid crop damage. Revegetation of cleared areas with forage species may be a partial answer to the problem of channel maintenance. Bermuda grass and blue panicum are possibilities for revegetation.

More Study Needed

It is probable that large infestations of salt cedar along the Salt and Gila Rivers will be removed by flood control programs. Further research is needed to determine the most effective methods of vegetation removal, maintenance of cleared areas and the effect of vegetation removal on groundwater.

New Formulations Found Effective for COTTON INSECT CONTROL

George P. Wene and

L. W. Sheets

The reader's attention is directed to Bulletin A-2, "Cotton Insect Control," by Dr. J. N. Roney and Dr. George Wene. This University of Arizona Extension bulletin may be obtained free from your local County Extension Agent.

Insect problems of cotton are receiving major attention in a cooperative field research program conducted at the University of Arizona Cotton Research Center by entomologists from both the university and the U.S. Department of Agriculture.

The beet armyworm was one of the most destructive insects attacking cotton in 1959. Previously satisfactory control recommendations, particularly mixtures containing toxaphene and DDT, were inadequate as air applications against unusually heavy infestations of beet armyworms in portions of Maricopa County. Under these conditions the following insecticide mixtures were effective in 1959 tests. (Amounts refer to pounds per acre):

1. **Dylox 1.5 lbs., plus DDT 1 lb. A mixture of Dylox 1.5 lbs., toxaphene 2 lbs. and DDT 1 lb. was also effective. Dylox was more effective in spray formulations than in dust mixtures.**
2. **Dibrom 1 lb., plus endin, 0.2 lbs.**
3. **Dilan 0.9 lb., plus endrin, 0.3 lb.**

Two to three applications at weekly intervals were needed.

Control of salt-marsh caterpillars ("wooly worms") was attempted in 1959 with a dust formulation containing spores of a bacterium known as *Bacillus thuringiensis*. Early action was slow, but after a week this treatment was as effective as one of the better insecticide formulations. Cultures of this bacterium, which is not harmful to warm-blooded animals, are now available from several commercial sources. The formulation tested in 1959 contained 3 billion spores per gram and was applied at the rate of 30 pounds (13,600 grams) per acre.

Dilan Spray Effective

Dilan sprays, applied to cotton plants at rates of 0.7 and 1.25 pounds of toxicant per acre, killed newly-hatched salt marsh caterpillars, including those hatching from eggs deposited after treatment, for periods as long as 13 days. The higher dosage did not extend the period of effectiveness. New insecticides which also gave good control of salt marsh caterpillars in 1959 tests included formulations of Dibrom, Korlan and Trithion.

The cotton leaf perforator, one of the more difficult Arizona cotton pests to control, was effectively controlled in 1959 tests with formulations of the following new or experimental insecticides: Dibrom, Dimethoate, Korlan, Shell-4402, Strobane, and Trithion.

Tests in 1959 supported previous observations that spray formulations of most insecticides were at least as effective as dust formulations and in a number of cases were definitely superior. Dust formulations may still be preferable when it is desirable to combine dusting sulfur, for spider mite control, in the same formulation with one or more insecticides. In other instances the convenience and possibly greater effectiveness of spray formulations should be considered.

Multiple-Use Chemical Effective

In a test of application schedules a dust containing 15% toxaphene, 5% DDT and 40% sulfur was applied during July and early August at intervals of 7, 10 and 14 days. These applications reduced populations of lygus bugs 82%, 79% and 73%, respectively. Bollworms were controlled with 7 and 10 day schedules but not with a 14 day schedule.

The cotton leaf perforator was commercially controlled with a 14-day schedule but control effectiveness increased with shorter intervals between treatments. In the case of the bollworm, the 14-day schedule was still sufficiently toxic to an important predator, the minute pirate bug, to prevent it from offsetting the lower control produced by the insecticide. In 1959 the 14-day schedule appeared, therefore, to intensify rather than reduce the bollworm problem.

Dr. Wene is an Assistant Entomologist and Mr. Sheets a U.S. Department of Agriculture cooperator, both stationed at the University of Arizona's Cotton Research Center in the Salt River Valley.

5 Ag. Exper. Station Field Days in May

Agricultural Experiment Station field days in Arizona this year are nearly all scheduled. There may be more, so watch for the little schedule folder which your county agent should soon have for you.

Meanwhile, the list up to now includes:

MAY 6—Fourth Annual Poultry field day, at UA Poultry Research Center, Tucson.

MAY 13—Spring field day, devoted to small grains, alfalfa, and oilseed crops, at the Mesa Branch Station, Mesa.

MAY 20—Annual Safford field day, at Safford over in Graham County. This year the field day is shifted from fall until spring. Emphasis still will be on cotton, small grains and alfalfa.

MAY 20—Spring field day at the Yuma Branch Stations. Supt. Pritchard favors commodity field days, and this one will be devoted to commercial vegetables.

MAY 21—Cattle Feeders Day, at the university's two beef farms at Tucson. There is a new layout, new pens and feed mill, at the farm on the Casa Grande highway and the feeders will have a chance to see these things and hear about current research.

During the summer, County Extension Agents cooperating with Experiment Station research workers probably will schedule several county or area field days. Watch your mail, and your local newspaper, to be cued in on these. Statewide field days, however, are held pretty exclusively in spring and fall. Going into the fall, we have scheduled:

OCT. 5—Annual Cotton field day, Cotton Research Center.

OCT. 12—Dairy field day, Tucson

OCT. 14—Cotton field day at the Yuma Branch Station.

OCT. 21—Annual Fall field day at the Mesa Station. Supt. Pew is planning panels on grain sorghum, silage sorghum, discussions on alfalfa and whatever oilseed crops are in season.

NOV. 2—Citrus field day at the UA Citrus Station southeast of Phoenix

NOV. 18—Citrus field day at Yuma, up on the Yuma Mesa Station.

Larger Grapes With Gibberellins Plus Girdling

G. C. Sharples, J. R. Kuykendall and L. F. True

Thompson seedless grapes are normally girdled — a strip of bark removed from around the main trunk of the vines — very shortly after berry-set to increase the size of berries. For two years we have been experimenting with the use of gibberellin sprays as a possible substitute for this girdling operation.

In 1958 gibberellin sprays caused no significant increase in total yield of the treated vines, but there was a significant increase in the size of berries. On vines which were both sprayed with gibberellin and girdled there was a tendency for a reduction in soluble solids or sugar. The sprays used in our 1958 tests were applied at a later stage of berry development than usual in other areas.

Looking For the Answers

In 1959 we sought to learn if spraying the vines with gibberellin would maintain or increase berry size, as is done by the normal practice of early girdling. Could we then increase the sugar content of the berries by girdling the vines shortly before the berries mature? Seeded types of grapes, such as Cardinal, are normally girdled just before maturity to increase sugar content. Such girdling does not increase size of berries. In 1959 tests were therefore designed to compare the time of applying gibberellin sprays and time of girdling the vines and the interactions of gibberellin sprays and girdling.

Gibberellin sprays applied at full bloom had no effect on yield or cluster weight compared with unsprayed vines, but there was a definite tendency for the full-bloom sprays to increase berry size and sugar content. Sprays applied following berry-set increased yield, cluster weight and berry size but tended to decrease soluble solids or sugar content. These changes were generally proportional to the concentration of gibberellin used in the sprays.

When girdling was done just after berry-set — which is normal commercial practice — yield, cluster weight and berry size were increased and soluble solids decreased compared with vines which were not girdled or vines which were girdled just before maturity of the berries. This late girdle caused a very striking increase in soluble solids compared with no girdle or a girdle applied just after berry-set.

Compare Two Treatments

Data presented in the table below enable a comparison of normal commercial practice (Treatment 2) with the application of only post-bloom gibberellin sprays and the combined application of post-bloom gibberellin spray and early or late girdling.

Gibberellin sprays alone produced larger berries which contained the same soluble solids as vines which were neither sprayed nor girdled (Compare Treatments 3 & 1) or those which received normal practice (Treatments 3 & 2). Early girdling appears to decrease soluble solids compared with no girdling (Treatments 1 & 2) or late girdling, regardless of whether the vines were sprayed with gibberellin or not (Treatments 3, 4 & 5).

Results of these experiments show significantly larger berries on the vines sprayed with gibberellin than on vines which were subjected to the normal practice of girdling after berry-set. Where vines were sprayed with gibberellin and girdled late we obtained both the increase in berry size and a highly significant increase in soluble solids.

Some Drawbacks, Too

When a research group obtains such interesting and spectacular growth responses it is difficult to admit that there are some shortcomings associated with the results. It was exceedingly difficult to apply the late girdle, since by the time this operation was to be performed the bark of the vine trunks had become very tough and fibrous compared with a more succulent condition earlier in the spring.

Although there was more sugar in the harvested berries. there was a lower acid content which tended to give the berries a somewhat flat and astringent taste. Some of the berries from the gibberellin-treated vines seemed to have a thicker, tougher skin. We hope to overcome some of these difficulties in 1960 tests.

Mr. Sharples is a Research Associate in Horticulture at the Mesa Branch Experiment Station; Dr. Kuykendall is an Assistant Horticuiturist, and Mr. True is Assistant County Extension Agent in Maricopa County.

Effect of Sprays and Girdling

Treatments	Yield kilos/vine	Cluster Weight grams	Berry Weight grams	Total Solids %	Acid %
1. Unsprayed, no girdle	11.4	310	1.97	16.6	0.66
2. Unsprayed, early girdle* (Normal commercial practice)	21.0	422	2.11	15.6	0.67
3. Sprayed with GA, no girdle	17.2	432	2.56	16.4	0.62
4. Sprayed with GA, early girdle	21.6	508	3.06	15.8	0.58
5. Sprayed with GA, late girdle	16.8	418	2.88	17.8	0.60

*Early girdle — immediately after berry-set.
Late girdle — 2 weeks before harvest.
GA — post-bloom gibberellin spray.

Cochise County

KAWT, Douglas—Mon. and Wed., 6:55 a.m.
KAPR, Douglas—Sat., 12:15 p.m.

Coconino County

KCLS, Flagstaff—Tues. and Thurs., 8:20 a.m.
KCLS, Flagstaff (Home Agent) — Thurs., 9:45 a.m.

Graham County

KGLU, Safford—Sat., 9:00 a.m.

Maricopa County

KRUX, Phoenix — Mon. thru Sat., 5:55 a.m.
KTAR, Phoenix—Thurs., 12:45 p.m.
KOY, Phoenix—Sun., 8:45 a.m.

Pinal County

KCKY, Coolidge — Mon. thru Fri., 6:25 a.m. and 9:20 a.m.; Sat., 9:15 a.m.
KPIN, Casa Grande—Mon. thru Fri., 6:55 a.m. and 9:30 a.m.; Sat., 12:30 p.m.; Sun., 8:30 a.m.

Yavapai County

KYCA, Prescott — Mon., Wed., and Fri., 6:10 p.m.
KNOT, Prescott — Mon., Wed., and Fri., 6:45 a.m.

Yuma County

KYUM, Yuma—Mon. thru Fri., 6:35 a.m.
KVOY, Yuma—Mon. thru Fri., 12:35 p.m.

El Programa Mexicana

A weekly farm and home program broadcast in Spanish by Stations KEVT, Tucson; KVOY, Yuma; XEXW, Nogales; and XEFH at Agua Prieta.

One of a Series

Careers In Agricultural Economics

Jimmye S. Hillman

Within recent decades a new member of the agricultural family has burst upon the scene — the agricultural economist. Today, in the 1960's, a new type of thinking — economic thinking — is predominant down on the farm. A new type of farmer must face new problems with new tools. New orientation and new educational opportunity must be provided for those who would enter agriculture as a profession in the atomic era.

The agricultural economist was born of necessity to help solve problems resulting from the commercialization of agriculture. His generation speaks of machines, technological change, specialization, dollar receipts, and the income tax. Though he speaks with nostalgia last century's language of the frontier and self-contained farm life, he does not expect nor wish to return to that era.

Farming Is A Business

Today, farmers must sell, not use, most of their products. The job of the farm economist is closely tied to the efficient production and marketing of those products. Therefore the field of the economist is the broad business aspects of farming. He is interested not only in high production rates, low production costs and easing the work-load of the farmer, but also in the many and complicated processes involved in transporting, processing, distributing and servicing farm products.

The work of agricultural economists is usually separated into two broad areas, production economics and marketing. Three other branches of study — agricultural policy, statistics, and rural life — may be linked to the field but are of less direct importance.

Agricultural economics offers many opportunities to the student who wants to take graduate study. Many colleges and universities offer the Ph.D. degree in many special fields. Academic requirements are being increased for those who wish to hold many professional positions.

Wide Field of Opportunity

Job opportunities open to the holders of the bachelor's degree in agricultural economics vary widely. We have listed here some, but not all, of the job opportunities open to the holder of a bachelor's degree and to those who hold the higher degrees of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). Agricultural economists are preferred for jobs which require familiarity with statistical technique and agricultural policy.

UA Offers M.S. In Field

The Agricultural Economics Department of the University of Arizona offers a course of study which prepares the student for work in the groups of positions listed. It offers the master's degree for those who care to pursue graduate study.

Students interested in this field, the business aspects of farming, should contact either the Director of Resident Instruction, College of Agriculture, University of Arizona, or the head of the Agricultural Economics Department at the university and arrange a program of work which will best achieve the student's desired goals or which will put him in a position of high demand upon graduation.

Job Opportunities Open to the Agricultural Economist

To Holders of Bachelor's Degree

1. In Domestic Agriculture:
   a. Farm or Ranch Managers
   b. Cooperative Managers
   c. Junior Executives with Cotton Companies
2. In Commercial Work:
   a. Sales Representatives for Feed, Seed, Fertilizer, Machinery, and Insecticide Companies
   b. Agricultural Representatives for Commercial Banks; e.g., Appraisal and Consultant Service
   c. Cotton and Livestock Buyers
   d. Plant Managers for Packing Houses or Processors
3. In Government with:
   a. Extension Service—County Agents or Specialist Positions
   b. Agricultural Research and Marketing Services
   c. Commodity Credit Corporation
   d. Farm Credit Administration
   e. Farmers Home Administration
   f. Reclamation, Forest, or Soil Conservation Services
   g. Foreign Agricultural Services
4. Field Representatives, Workers or Analysts for Various Public or Private Agencies

To Holders of Advanced Degrees

Note: Holders of advanced degrees may find positions in all the fields listed in the opposite column. Moreover, there is an increasing tendency for all positions in public and private activities to favor the student with more training.

In addition to those jobs which are open to students with the bachelor's degree, there are:

1. Teaching positions in Colleges and Universities
2. Public Research Positions:
   a. State Agricultural Experiment Stations
   b. U.S. Department of Agriculture
   c. Other Government Research Agencies
3. Private Research Positions, for example:
   a. Private Agricultural Business Services
   b. National Cotton Council
   c. National Bureau of Economic Research
   d. Industrial Commodity Corporation

Dr. Hillman is an Agricultural Economist.

15 Agricultural Leaders Honored

Fifteen outstanding leaders in Arizona agriculture were honored at recognition ceremonies March 8, at a meeting of the Aggie Men's Club in the University of Arizona student union.

The honorees were each given copper medallions, such as described in Dean Myers' editorial on Page 2 of this issue of PROGRESSIVE AGRICULTURE. Each honoree has distinguished himself in some area of Arizona's wonderfully diverse agriculture — in cotton, cattle, commercial vegetables, citrus or some other facet of agriculture. In fact, these 15 have only two things in common:

1. Every one of them has worked toward group and industry goals as well as for his own economic advancement. This has taken form in industry leadership, association leadership and marketing improvement.

2. Every one of these 15 has realized that the continued existence of a prosperous agriculture is contingent upon a constant program of research, and the utilization of that research in production, management and marketing of food and fiber.

The 15 honorees are Henry Boice, Tucson; E. Ray Cowden, Phoenix; Cecil Collerette, Casa Grande; Melville H. Haskell, Tucson; Thomas Heady, Nogales; Obed Lassen, Phoenix; Mrs. Abbie Keith, Phoenix; the late J. David Lee, Thatcher, honored posthumously;

Albert Lent, Tucson; R. H. McElhaney, Wellton; Floyd Newcomer, Yuma; Dean Stanley, Phoenix; Orval Knox, Chandler; Reuben Hess, Phoenix; and J. Clyde Wilson, Goodyear.

Larger Herds Mean Lowered Costs of Producing Milk

Leo J. Moran

"What is the best size of dairy herd for me? What does it cost me to produce 100 pounds of milk? If I increase my herd size what will happen to costs of production?"

Probably every Arizona dairyman has asked himself these questions during the past year. While the answers are still a little uncertain, it should be worthwhile to look over the information in regard to dairy costs available at the University of Arizona.

UA Study Completed

Recently agricultural economists at the University of Arizona made an analysis of Arizona dairy producers to determine the cost of milk production. Size of dairy herd and production per cow, which have important influences on cost of production, were also examined. This work was supported by the Arizona Dairymen's League. Results of this study will be published as a University of Arizona technical bulletin.

This study shows that it costs the average Arizona dairyman $5.83 to produce 100 pounds of milk. This average dairyman milked 97 cows that produced 8,546 pounds of milk each per year. The accompanying table shows a breakdown of this cost of production into six items. Note that feed cost is half of the total expense, while labor and investment were the next most important costs.

Costs Drop For Bigger Herds

Labor, management and investment costs were selected for further study to see if they are different for different sized herds. Results of this analysis are shown. Costs for these three factors drop from over $259 per cow for the smaller herds to about $150 per cow for the large herds.

Labor cost declines as herd size is increased, mainly because of specialization. In larger herds, where more workers are employed, each worker tends to become a specialist. This not only allows each worker to become more proficient at his special task, but much time is saved because he doesn't move from one job to another.

Management and investment expenses decline with expansion in herd size because they do not need to be increased proportionately as more cows are added to the herd. Usually more cows can be added without adding another manager, and often herd size can be increased by making more intensive use of investment items (for example, a milking parlor), rather than by adding another item. Thus, when these cost items are fixed, herd expansion spreads the cost over more cows, lowering the cost per cow. There is, of course, a limit to how far a dairyman can spread these fixed cost items. If it weren't for this limit, there would be no reason why cows couldn't be added indefinitely without expanding investment.

'Capacity' Spells Economy

For example, take the investment in a milking parlor. As more and more cows are milked with the existing parlor, each cow's share of the cost of owning and operating the parlor declines. If herd expansion continues, however, a point is reached where another parlor unit must be built. If only a few cows are added beyond the capacity of the old parlor, the cost per cow will again be very high. Then, as the capacity of the second parlor is approached, the parlor cost per cow will again fall.

The number of cows involved in each of these "expansion steps" depends on the type and size of parlor being used. Ralph Van Sant, University of Arizona Dairy Extension Specialist, and others prominent in Arizona's dairy producing industry believe these steps may involve from 200 to 240 cows.

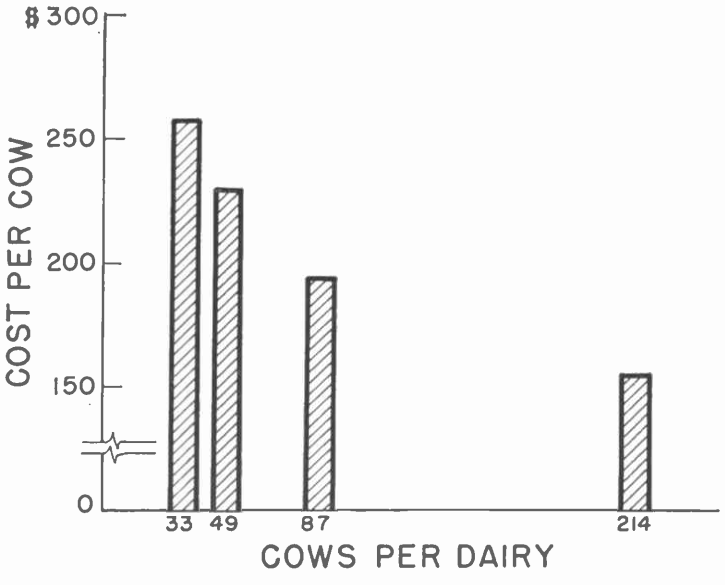
"I think a parlor unit about the size we have at our new University of Arizona Dairy Research Center at Tucson would be about optimum from a cost standpoint," says Mr. Van Sant. "It would take from 200 to 240 cows to fully utilize the parlor unit we have out there."

Other Factors, Too

Any cost advantage held by larger herds is an important consideration when deciding the best size of herd. Cost of production is, however, only one of several important considerations when planning optimum herd size. Other important factors that should be considered include: managerial ability available to manage a larger herd, capital available for financing herd expansion, and the availability of competent labor to handle additional cows.

When all of these questions are answered, a dairyman can make the correct decisions as to what is the best herd size for his situation. And while cost of production is not the only consideration — it is still worth quite a lot of study.

HOW LABOR, MANAGEMENT AND INVESTMENT COST PER COW CHANGE WITH SIZE OF DAIRY HERD.



Average total cost of producing milk in Arizona per dairy,* per cow, and per hundredweight of milk produced

Cost Item	AVERAGE COST		
	Per Dairy*	Per Cow	Per Cwt. of Milk
Feed	$24,182	$249.29	$2.92
Labor	8,528	87.92	1.02
Investment	6,943	71.58	.84
General Production Expense	3,142	32.49	.38
General Marketing Expense	3,107	32.03	.37
Management	2,474	25.50	.30
Total	$48,376	$498.81	$5.83

*Based on an average dairy of 97 milk cows.

Dr. Moran is an Assistant Agricultural Economist.

Teaching Young Fellows How to Select the Best

UA Has Developed Some Top Livestock Judges

E. B. Stanley

Livestock judging is an important part of the animal science students' training program. It is the most-used talent of the stockman. Every time an animal is bought or sold, judgment must be passed on its worth.

Livestock breeders have long relied upon the stock show judge to appraise their animals in competitive exhibition. The increasing popularity of the livestock show testifies to the stockman's great interest in improved animals, and his growing appreciation of their value.

Young Folks Are Show Folks

The recent record-breaking 12th annual Arizona National Livestock Show held in Phoenix marks a notable achievement in a state-wide livestock improvement program that had its inception in the former Tucson Livestock Show. Probably the most popular and most important feature of today's livestock show is the junior division. The 4H and FFA groups have taken full advantage of the opportunity afforded by the stock shows to enter their own animals in competitive exhibition, and also to participate in contest judging.

Mention can be made in this regard to the record of two former Arizona 4H Club members and College of Agriculture alumni whose pictures, taken at the 1936 Tucson Livestock Show, are shown here. Bob McKinney, son of C. L. McKinney (deceased), pioneer Arizona cattleman, is manager of the extensive Cushman ranching interests located in Arizona, Colorado and Canada. Walter (Bud) Thurber, son of H. B. Thurber, prominent cattle rancher at Sonoita, Ariz., is a partner-manager of the nationally known Bridwell Hereford Ranch, Wichita Falls, Texas.

Few men have had as great opportunity to be an inspiring, educative influence on young Arizonans headed for a ranching career as Professor Stanley of the Department of Animal Science. He has directed, encouraged and taught hundreds of aspiring stockmen since he first came to the University of Arizona staff in 1920.

Began 35 Years Ago

Livestock judging as a student activity was originated by the Agriculture Club in 1925. Believing in the value of training to be gained from the practice judging of agriculture products, and the benefits afforded in intercollegiate competition, this group sponsored and helped in defraying travel expenses of the team. In 1934 stock judging was given official status as a University student body activity.

It is essentially in the field trip category, enabling advanced students in Agriculture to observe practices in the state and elsewhere, complementing their regular academic training and giving them proficiency in the judging of livestock.

Girls Do Well, Too

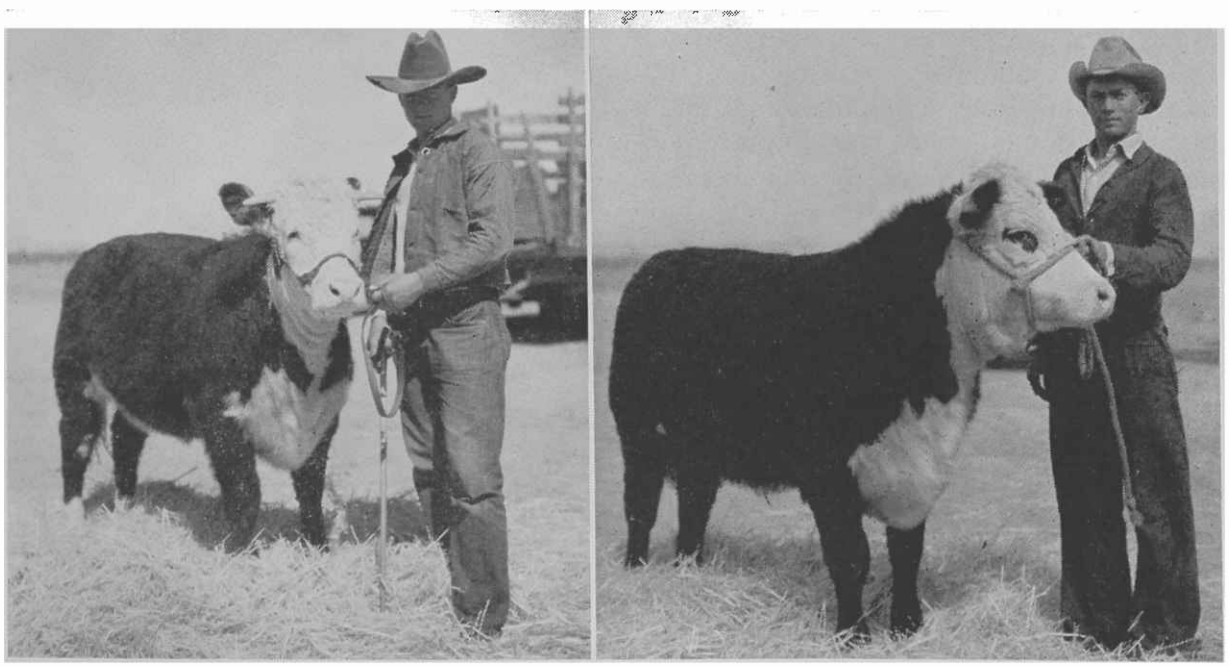
Arizona judging teams in recent years have won national acclaim in successful competition with leading colleges and universities. Terri Heckleman Poer, woman an member of an Arizona judging team, was second high individual of the 75 contestants with the highest score ever made by a woman, in the 1953 Fort Worth contest. This team was also awarded first place in swine judging at the Cow Palace in San Francisco.

In 1954, Arizona scored firsts in quarter horses at Fort Worth and Denver and in sheep at Denver. Signal honors were won in 1955, the UA team taking first in beef cattle and second for the entire contest at Denver; second in beef cattle and third in quarter horses at Fort Worth. The 1956 team won a first in beef cattle at the Grand National in San Francisco. Harold Mather and Joe Lane of the 1957 team took individual honors in judging quarter horses and Angus cattle, respectively, at Fort Worth. In 1958, Arizona won a first in beef cattle at the Golden Spike Show in Ogden, and in sheep at Fort Worth. In 1959, the UA team took first in quarter horses at Fort Worth.

Stockmen Have Helped

Much credit for the success of the university judging teams is due to the cooperation and help of many of the cattle and quarter horses breeders throughout the state. These stockmen have gone all out for the judging team activity by making their livestock available and spending much time in helping with the instruction of the teams. Several have contributed financial aid in the form of scholarships, to help meet travel expenses to the contests.

Until a more effective means of improving livestock is developed and proved, livestock judging will continue to be of foremost importance in the field of animal production.



TWO OUTSTANDING cattlemen, photographed at the time they got their start as University of Arizona student livestock judges, are Bud Thurber, left, and Bob McKinney, right.

Amount of Fertilizer Makes the Difference In Sorghum Yields

Lee S. Stith, T. C. Tucker and H. F. Kreisinger

The grain sorghum yield story is just about told in one statement: *The amount of fertilizer applied to any variety directly influences the yield obtained*. There is an amount that is economical to use and an amount necessary to get the highest yield. However, all hybrids or standard varieties give like responses for any given rate of nitrogen or phosphate applied.

The hybrids or standard varieties of sorghums may differ in yield potential. A late maturity group may exceed an early maturity group at any location. Within any group, yield increases follow the same general pattern of additional fertilizer increments giving larger yield increases up to the point of diminishing returns.

Varieties and Hybrids

The basic question usually asked is, "Will a short season hybrid require less fertilizer than a full season one to make the maximum yield?" To answer this question, experiments were conducted using three maturity groups of hybrids and one standard variety at each of four locations in 1958 and three in 1959. Maturity groups were given primary consideration rather than specific hybrids, since yield at various locations is directly related to the adaptation of the group.

The specific sorghums selected were: (a) short season—RS 501, (b) medium season—RS 610, (c) late season—DeKalb F-62A, Texas 660, and (d) the standards—DD 38, DD Yellow Sooner or Plainsman that were used as checks depending on the area. Tests were located in the major climatic areas in Arizona where grain is grown.

Included were Willcox (Cochise County), Eloy and Stanfield (Pinal County), Tolleson (Maricopa County) and Wellton and Roll (Yuma County). Nitrogen and phosphate fertilizers were applied in nine different treatments or combinations on the sorghums grown at each location.

Yield results indicate that: (a) longer season hybrids out-yield shorter season hybrids or standards and (b) hybrids generally out-yield standards as shown in Table 1. The test results give no indication that short season maturing sorghums use fertilizer more efficiently than do full season ones.

Fertilizer Rates Important

A favorable economic response within the range of 60 to 120 pounds of nitrogen per acre is evident from Table 2. It was within this range that the economic level was reached, although the maximum at any location may be higher, as shown by the yield in Cochise County (1958). A grower may expect a response to higher rates of fertilizer in Cochise County than in Yuma County. Climate probably is an important factor in the yields obtained in Yuma County. However, with early planting dates the whole picture will probably change.

Phosphates used alone contributed little to yield increases in these tests and growers can expect similar results except for specific farms or locations. Phosphate applied with high rates of nitrogen resulted in higher yields in some instances.

Table 1. Relative Yields of Selected Sorghums Grown in 1958 and 1959 Expressed as Percent of a Check

	Cochise Co.		Pinal Co.		Maricopa Co.	Yuma Co.	
Variety	1958	1959	1958	1959	1958	1958	1959
Checks							
DD 38	—	—	100	—	—	—	—
DD Yellow Sooner	—	—	—	—	100	—	—
Plainsman	100	100	—	100	—	100	100
Early Maturity							
RS 501	100	75	—	106	102	154	148
Medium Maturity							
RS 610	106	86	—	108	108	111	129
Late Maturity							
DeKalb F-62A	—	—	105	—	—	—	—
Texas 660	118	108	—	99	—	118	126

Table 2. Effects of Fertilizer On Sorghum Yields 1958 and 1959 Expressed as Percent of Check (no fertilizer)

lbs/acre	Cochise Co.		Pinal Co.		Maricopa Co.	Yuma Co.	
Rate	1958	1959	1958	1959	1958	1958	1959
0 (Check)	100	100	100	100	100	100	100
Economic Level							
60 N	143	126	127	111	128	111	114
120 N	163	125	140	114	145	121	118
Luxury Level							
240 N	182	114	136	110	169	134	121
120 N & P_2O_5	179	122	134	114	145	113	116
240 N & P_2O_5	209	110	141	112	181	121	112

Dr. Stith is a Plant Breeder and Dr. Tucker is a Soil Scientist. Dr. Kreisinger is an Assistant Agricultural Chemist at the Yuma Branch Experiment Station.