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Volume XV Number 1

Progressive AGRICULTURE IN ARIZONA

PUBLISHED BY THE COLLEGE OF AGRICULTURE OF THE UNIVERSITY OF ARIZONA AT TUCSON

New and Attractive Home Furnishings

See Page 4

WHAT? STOP RESEARCH?

The magazine "Better Farming Methods," which advertises itself as a "business magazine for leading farmers," lays the ghost of a widely held fallacy, a fallacy which has been given enough credence to deserve a sharp answer.

The magazine cites a frequently-heard remark: "Stop agricultural research and our problems will soon be cured." It is the easy answer of those who see research as a demon in America, ever prodding agriculture into higher production, mounting surpluses and lower prices.

Actually, that sounds logical, but sober second thought exposes it as full of basic flaws and twisted reasoning. We quote from the magazine:

"It is imperative that we continue research for the good of all society. If such a restrictive policy had been followed in the past we would not now be enjoying the highest standard of living ever experienced in the world. Our tables would not be graced daily by such things as fresh meats, vegetables and other products, and at reasonable cost, if research men had not forged ahead to develop new varieties and methods of storing and shipping.

"But there are other things to be considered. Should research be deliberately stopped or slowed, we would jeopardize our competitive position in world markets. This is no small item, for the United States is the world's largest exporter of agricultural products.

"Just last year, when a new record was set, the produce of 60 million of our 316 million harvested acres went overseas. The value of these goods was $5 billion. If through restricting research, we lost this outlet, everyone would suffer.

"This abundance also serves as a powerful force for world peace. Our food products are helping to relieve hunger and to promote the growth of many newly developed countries. For example, our wheat is providing the people of India an extra five billion loaves of bread a year. But all this food isn't just given away. We honor the currencies of many countries that need our farm goods but who do not have dollars for regular exchange. Barter and trade are important, too. In the past eight years we have swapped agricultural goods for strategic defense materials valued at over $1.4 billion.

"Research helps in another way by enabling us to conserve our land and other resources by producing more on fewer acres with less labor. Because of it we are now raising 70 per cent more per acre, and output per breeding animal is 96 per cent greater than it was in the period from 1919-21. Also, one hour of labor now produces more than four times as much food and crops as it did 40 years ago. This achievement, in turn, is the reason why one farm worker can produce food, fiber and other commodities for himself and 26 others.

"Each new development from the laboratories leads to others, providing new jobs for our labor force. Although farming continues to employ fewer people, its seven million workers still are more than the combined employment of the transportation, public utilities, steel and automotive industries.

"In addition, four out of every ten jobs in private employment are related to agriculture. Ten million people work at storing, transporting, processing and merchandising agricultural products and six million are kept busy providing the supplies farmers use.

"All these activities are built on research and if it were terminated they would soon deteriorate or stagnate. If we should slow or stop research we might also suddenly find it necessary to surge forward in order to meet changing needs, only to find we cannot do so.

"No. Stopping research is not the answer to our agricultural problems and those who propose it as the solution do not realize what disaster it could bring."

Harold E. Myers

Dean
College of Agriculture
and
School of Home Economics

PROGRESSIVE AGRICULTURE IN ARIZONA

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In This Issue

Our Cover Picture

Our cover picture shows Miss Sharee Stillman, a Home Economics student, displaying decorative fabrics in a Tucson store. (See article on Page 4.)

National forests are administered under multiple-use and sustained-yield management policies so as to provide maximum benefits for the public. In Arizona the national forests have played a positive role in the state's economic growth.

New Machine May Revolutionize Lettuce Harvesting

A machine that may well revolutionize the lettuce industry, second largest farm business (dollar-wise) in Arizona, is now being developed at The University of Arizona's experimental farms.

It is a discriminating lettuce picker. Discriminating because it automatically rejects lettuce heads that haven't reached the maturity needed for harvesting.

Behind the project is graduate student Bill Harriott, part-time research assistant at The U of A, who for five years prior to coming to Tucson was a designer of farm equipment.

More Work Needed

Harriott, who started on the invention as soon as he enrolled at UA in September of last year, says that although the machine has reached the stage of reality, several more years are needed to perfect it to the point where it can be produced commercially.

Its impact on the lettuce industry, which in the past forty years has grown to a peak of some $35 to $45 million annually in this state, will be felt primarily in two areas.

It will help solve the growing labor problem. Lettuce remains one of the crops which is entirely hand picked, usually by migratory workers or braceros. And the workers have to be trained to pick lettuce properly, by size and firmness of the head.

Harriott says the recent federal restrictions on imported labor, and the shortage of domestic help, not even available in some areas, has created a labor problem. In Arizona, most regions where lettuce is grown yield two crops each year, unlike the midwest.

Will Cut Labor Cost

Secondly, under the present manual harvesting of lettuce, as much as 20 per cent of the price is attributed to picking and packaging. "We think it will substantially reduce the cost of lettuce," Harriott said.

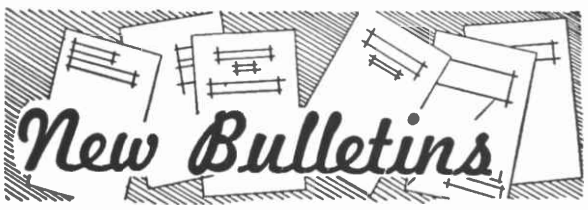
The machine is now in two individual pieces which have to be integrated into one working unit. The first consists of two robot-type arms which travel down a lettuce row, measuring the firmness and size of the heads. If the head comes up to par, the arms signal the lettuce cutter — a series of shovel-like blades which scoop down and take the head.

Plan Conveyor-Packer

A third part, yet to be devised and added to the machine is a conveyor and packaging unit, which will receive the selected heads.

The cutter is powered by a hydraulic motor, and the entire unit mounts on a farm vehicle. Both units are operational to some degree now, and represent the only such machine in the nation.

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



These and other College of Agriculture publications are available to residents of Arizona from local County Extension Offices. Or you may write to The University of Arizona at Tucson for them. The publications listed below have been issued since the last issue of *Progressive Agriculture in Arizona.*

Bulletins

A-1 (revised)—Chemical Weed Control Recommendations for Irrigated Areas of Arizona

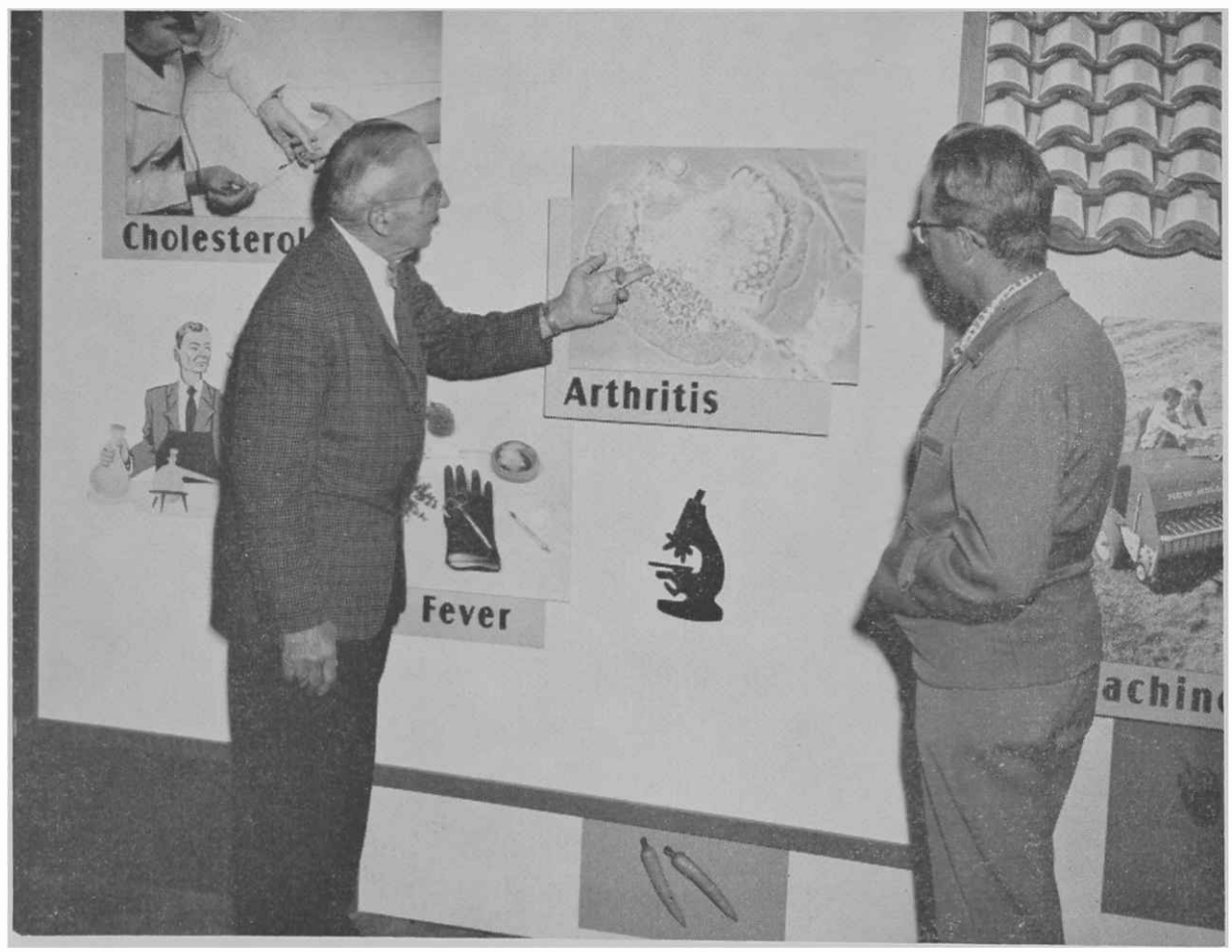
Circulars

240 (reprint)—Madam Chairman, a parliamentary handbook

Folder

77 (reprint)—Inventory and Record of Important Papers

UA Research Exhibit at State Fair



EVERY YEAR the U of A College of Agriculture brings an instructive story to the Arizona State Fair at Phoenix. Last November's exhibit stressed the medically-related research which this college is doing. Manning the exhibit was Dr. T. F. Buehrer, who had been a staff member of this college for many years, prior to retirement. He is shown at left above. At right is Lloyd Patterson, U of A agronomy research assistant at the Cotton Research Center. In the show ring a Holstein sire entered by the university topped his breed, with other ribbons being won by beef entries. (Photo by Bob McKnight)

What's New In Home Furnishings

Furniture Stores and Designers' Studios were Never More Exciting. Some of the Intriguing Things You Would See are:

Mildred R. Jensen

(1) THE PERIOD LOOK. There is still plenty of handsome modern furniture around, but the new look is a period one. Fine antiques and new pieces designed with a period flavor are for sale everywhere. Furniture styles, old and new, are mixed. Take care to repeat the wood color or the lines of an old piece so that it will fit into the group. And make sure the old or the new-old design is useful to your family — not just a useless thing kept for Victorian sentimental reasons.

People from the Southwest will be interested to see some old and some newly-done Spanish pieces. Some of these have the dark heavy wood with carving and touches of ornamental iron work; some are in lighter woods.

(2) THE LOOKS OF RICH COLOR AND PATTERN. If you are weary of the quiet conservative look, or of bare expanses, you will love the rich color and handsome pattern in floor tile, drapery and upholstery fabrics and wall coverings. (Watch out for some of the patterned cloths with foot-wide flowers. They are made for large rooms.)

(3) THE MANY NEW WINDOW TREATMENTS. Window shades are back, but they may be handsome Roman shades in fine fabrics, or fabric-covered roller shades with handsome matching valances. There are fabric-covered screens, elegant Austrian shades, and a thousand varied window curtain designs. Scout the pages of any decorating magazine and cut out the ones that interest you. Maybe they take up less room than old style draperies. Maybe they just look different!

(4) THE "AREA RUG." Wall-to-wall carpeting made many a small room look larger, but the big news in rugs is the "area rug." Small bright colored accent rugs have long been in use, but the area rug covers an area — the space under a dining table and chairs, the space under a living room grouping of sofa and chairs, etc. It may be custom designed to suit your fancy and handmade and very expensive. (Hooked rug experts should take note!)

It may be moderate in price and may be made in ovals or circles or other "free form" shapes, since a tufted rug may be cut easily. In any case, the area rug must fit well in color and texture with the tile or wood or whatever is used on the rest of the floor in the room. An area rug can emphasize a furniture group very well, or supply the pleasure of interesting pattern and rich color to an otherwise tame room.

MISS SHAREE STILLMAN, a Home Economics student from Phoenix, arranged this decorative setting at Barrows Furniture Co. store in Tucson, in cooperation with the store's own designer. This is part of Miss Stillman's work toward her major in interior design. Incidentally, Home Economics students in many fields get practical training, to complement class and laboratory work, via such experience in several stores, schools and other facilities in the Tucson area.

Texturized Nylon

Carpet-woven rugs are still made but are expensive. Market estimates indicate that some 75 per cent of all carpets this year will be made by the less expensive tufted process. New forms of texturized nylon, such as Chemstrand's Cumuloft. DuPont's Differential 501, and Allied Chemical's Caprolan, are used in the surface pile or the tufts on the face of the rug. Some rich new metallic shades like deep gold, bronze and copper, as well as unusual shades like lilac and orchid, orange and tangerine and dusty pink are available in Caprolan.

The newest fiber to be used in carpet face pile is polypropylene. Two on the market now are Herculon and Merkalon. They are said to be used for polypropylene's washability, light weight, durability, resilience, resistance to moths and mildew, as well as protection against pil-

(Continued on Next Page)

Mrs. Jensen is a professor in the Textile, Clothing & Related Arts Department of the School of Home Economics, teaching classes in Interior Design.

(Continued from Previous Page)

ing and shedding. The acrylics Creslan and Verel introduced last year continue to be used in moderately priced carpets.

(5) GOOD-LOOKING METAL FURNITURE. The first metal based furniture looked stiff though sturdy, but new designs have produced many handsome pieces in which the metal seems a part of the design. These pieces look like furniture suited to more elegant uses.

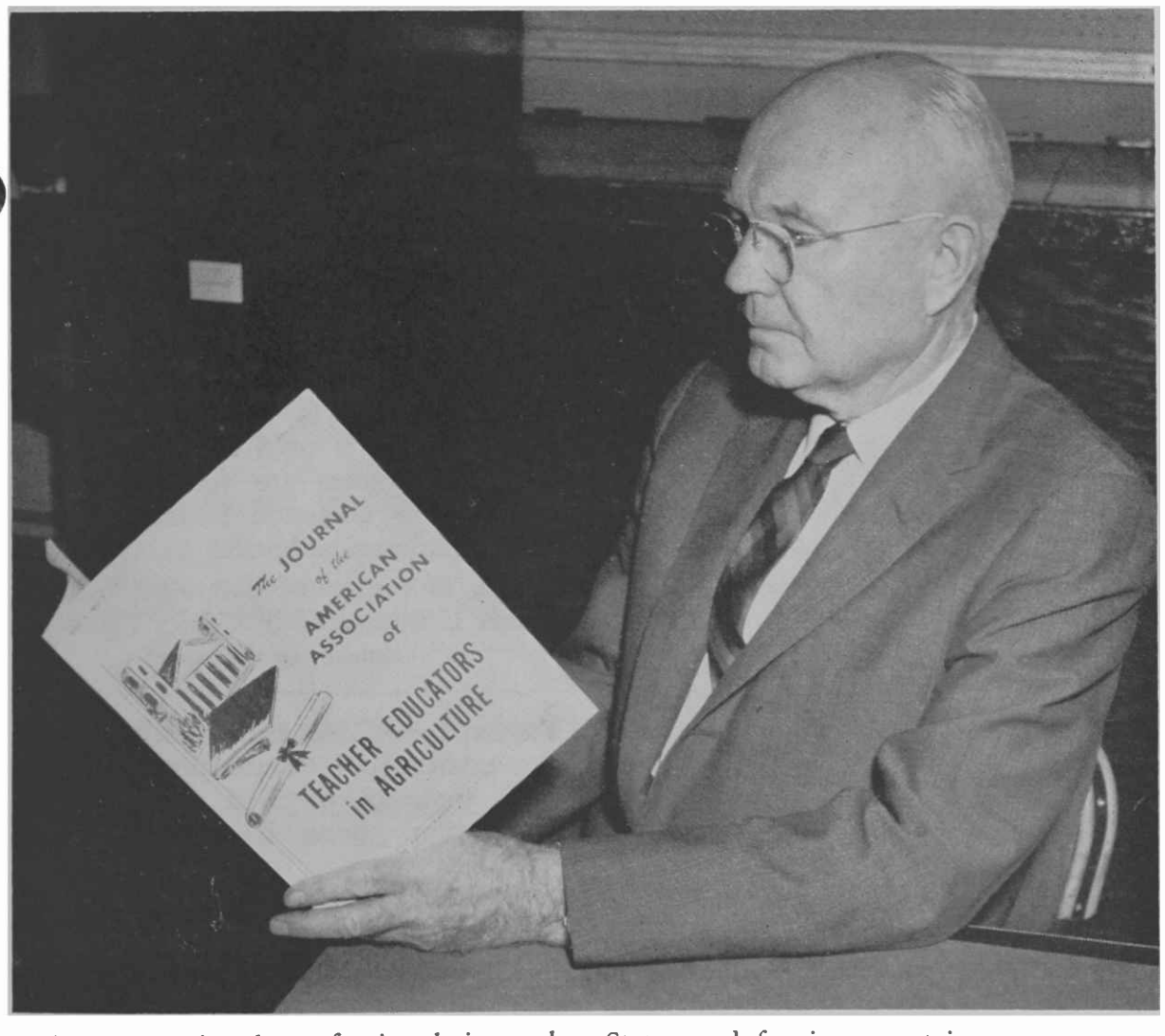
(6) DRAPERY FABRIC DEVELOPMENT. Besides rich color and interesting texture, this year's introductions stress flame resistance. Verel, Saran, and glass are the fibers used for their fire-retardant properties. Glass fiber fabrics also show many beautifully colored designs.

(7) THE STRANGE AND THE NEW includes some non-woven fabrics in which fibers are fastened together in a woven cloth look, even with simple designs. Upholstery cloth can be molded to chairs over urethane foam padding, thus saving a great deal of labor and seaming. The fabric remains soft as ever. We have already seen dynel fabrics molded to TV and stereo speaker grills.

The prize in this area probably goes to the "Air Stool" by Verner Panton. It is made of sections of clear and opaque plastic so that the solid-looking sections seem to set on air!

(8) PRACTICAL FINISHES include Scotchgard stain repeller used extensively on slip cover, drapery and bedspread fabrics this year. A new chemical yarn treatment for wool called Texylon is said to extend the life of wool carpeting by at least 40 per cent.

Another Issue is Off the Press



A new national professional journal, now in its second year, is edited by Dr. Russel W. Cline, head of the Department of Agricultural Education in The University of Arizona.

Circulation of the new publication includes persons in agricultural education and related fields in more than 80 colleges and universities in the United States and foreign countries.

"The Journal of the American Association of Teacher Educators in Agriculture" is official publication of the American Association of Teacher Educators in Agriculture, an organization affiliated with the American Vocational Association, National Education Association and Associated Organizations for Teacher Education.

Cochise County

KAWT, Douglas—Check local listings.

KWCT, Willcox — Mon. thru Fri., 7:45 a.m.

Coconino County

KCLS, Flagstaff — Tues. and Thurs., 8:20 a.m.

KGLS, Flagstaff (Home Agent) — Thurs., 9:45 a.m.

KPGE, Page — Fri., 2:30 p.m.

Graham County

KATO, Safford — Sat., 9:30 a.m.

Maricopa County

KTAR, Phoenix — Mon. thru Sat., 5:30 a.m.

KUPD, Phoenix — Mon. thru Sat., 5:30 a.m. and 12:25 p.m.

KPHO, Phoenix — Mon. (cotton report) 12:40 p.m.; Thurs. (dairy and livestock report) 12:40 p.m.

Navajo County

KDJI, Holbrook — Tues., 12:45 p.m.

Pinal County

KPIN, Casa Grande — Mon. thru Sat., 6:55 a.m.; Mon. and Fri., 9:30 a.m.; Tues., Thurs. and Sat., 12:20 p.m ; Fri., 5:00 p.m.; Sat., 7:00 a.m.

Santa Cruz County

KNOG, Nogales — Mon., 6:30 a.m.

Yavapai County

KYCO, Prescott — Mon., Wed. and Fri., 5:55 p.m.

KNOT, Prescott — Mon., Wed. and Fri., 5:35 a.m.

Yuma County

KVOY, Yuma — Mon. thru Fri., 5:45 a.m.

KYUM, Yuma — Mon. thru Fri., 6:25 a.m.

Federally Fed

USDA food distribution programs touched lives of one of every six people in the nation in 1962. About two billion pounds of food, valued at $366 million, were distributed in fiscal 1962 (50% more than in 1961). Benefiting were some 26 million school children sharing in lunch and milk programs, 7.4 million people in needy families (compared with 5.6 million in 1961) and 1.5 million people in institutions (16% more). Some four million pounds of food were available to victims of floods and other natural disasters in 16 states and Puerto Rico.

—USDA News Letter

Systemic Insecticides in Commercial Potato Production

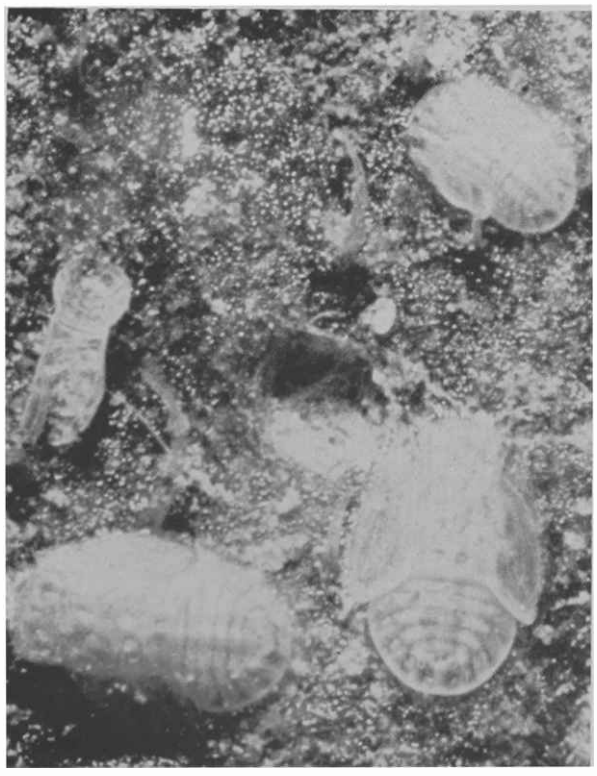
Paul D. Gerhardt and Don L. Turley

Potato growers in Arizona are more fortunate than those in other areas of the United States because they do not have to contend with two of the most serious potato insect pests, the Colorado potato beetle and the potato tuber moth.

In Arizona the insect of most concern is the potato psyllid. Other insects which are problems in potato production are aphids — but chiefly the green peach aphid, leafhoppers, and grain thrips. All of these are classified as sucking insects. The potato psyllid is most serious because the feeding nymphs transmit the psyllid yellows disease.

Psyllid yellows-infected plants usually set more tubers than normal, but fail to mature them. The plants become yellow with a purple tinge. The top growth is reduced and gnarled. The result is reduced yield. In the recent past, several phosphate type systemic insecticides have been particularly effective against these sucking insects. A more recent innovation is the granular formulation of these insecticides.

BELOW, SECOND and third instar potato psyllid nymphs. Magnified 20 times natural size.

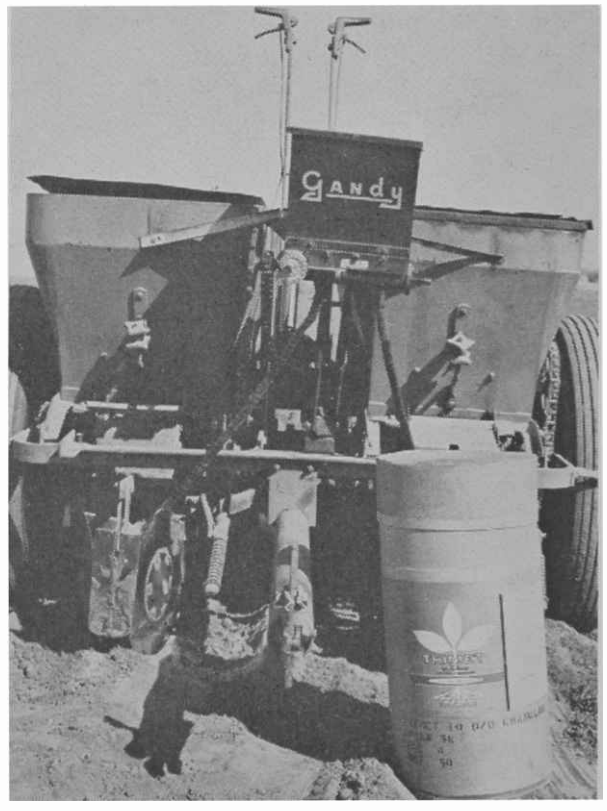


Two Granules Effective

Since 1959, studies have been made using these insecticide granules for potato insect control in Arizona. The two insecticides that have been most effective are phorate (Thimet) and Di-syston, each used as 10 per cent granules. These insecticides are generally applied through a dry insecticide applicator mounted on a potato planter. In this manner, granular insecticides may be applied in one or both of the fertilizer bands during the planting operation.

The granules may be introduced through the fertilizer tube or directly into the fertilizer shoe. It is important that the tube connecting the applicator to the fertilizer shoe be maintained straight enough to minimize flow stoppage, which would cause faulty application and areas of untreated soil. The placement of the granules should be in the fertilizer band, 3 to 4 inches to the side and approximately an inch below the seed pieces. Granules placed deeper or further from seed pieces will be less effective. Proper safety precautions must be taken when these insecticides are handled.

SHOWN BELOW IS the dry insecticide applicator used to apply granular systemic insecticides, mounted on a two-row potato planter.



Dr. Gerhardt is an associate entomologist and Mr. Turley is an assistant in entomology, both working at the Mesa Branch Experiment Station.

Because it is necessary for the roots to take up the insecticide so it can be moved into leaves and stems of the plant, the material must be dissolved in the soil solution. To accomplish this, the potato fields should be irrigated within a week or two after the stand is established. This is essential for effectively protecting the young plants early in the growth period, particularly when severe psyllid infestations are suspected or indicated. Such conditions were experienced during 1962.

Look For Freckled Leaves

When phorate is taken in by the roots and translocated into the leaves and stems, its metabolites tend to accumulate in the tips and margins of the leaves. When this happens these areas will generally turn brown and become necrotic. There also may be small, brown, necrotic spots throughout the leaf blades. The presence of these spots, brown tips, or necrotic leaf margins is a visible sign that the phorate has been taken into the plant in amounts adequate for insect control. Such leaf injury is minor and will not affect plant growth or yields materially when phorate is used as recommended. Similar symptoms are found in plants treated with Di-syston although not as pronounced as in phorate.

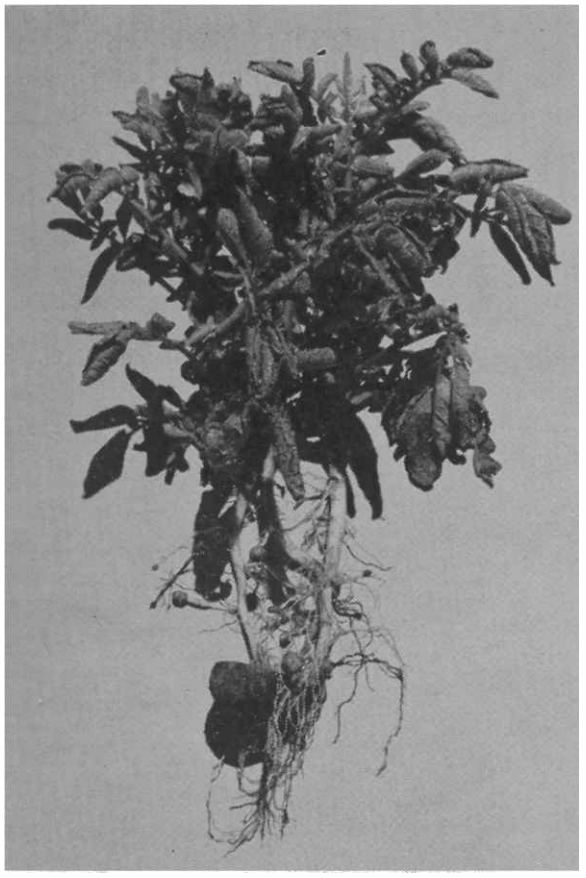
Lack of control of potato psyllids and aphids is illustrated in Tables I and III.

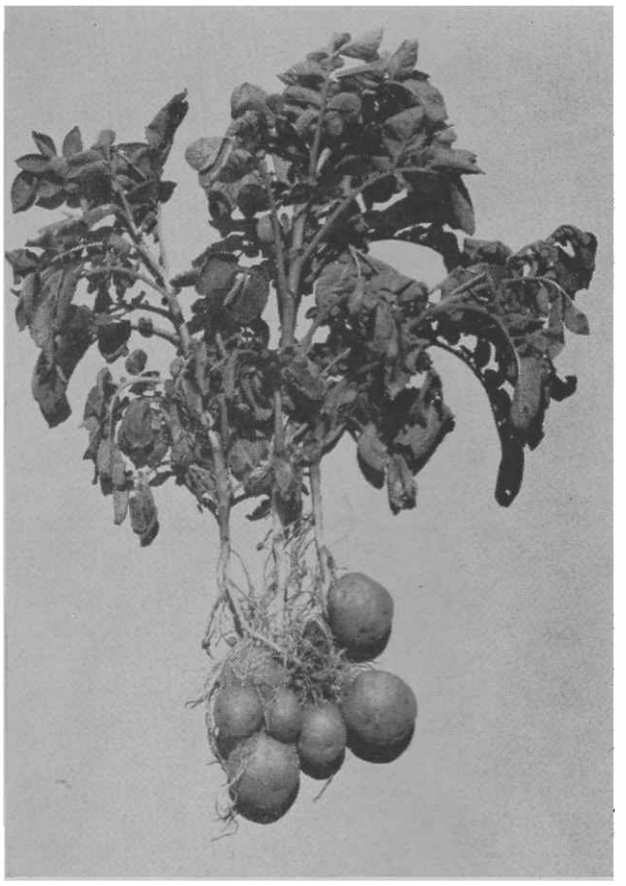
(Continued on Next Page)

Table I. — Effects of phorate on the control of green peach aphid and potato psyllid in Pontiac Potatoes; Mesa Branch Station, 1960.

Sampling Dates	Insects per 25 Leaves: Untreated Green Peach Aphids	Untreated Potato Psyllids	Treated[1] Green Peach Aphids	Treated[1] Potato Psyllids
March 24	2829	0	2473	0
April 6[2]	64	0	45	0
April 15	134	0	14	0
April 26	55	55	1.3	0
May 6	8	65	0	0
May 13	3	6	0	0
May 25	0.3	0.5	0	0

[1]Phorate (10 per cent granules) applied at planting time, February 16, 1960.
[2]First irrigation applied prior to second sampling date.





AT LEFT IS AN untreated potato plant showing psyllid yellows symptoms. At right a normal plant from a treated plot. Compare tuber set and size.

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Dramatic results are shown in Table I where an application of 20 pounds of 10 per cent granular phorate per acre was applied at planting time. As many as 65 psyllid nymphs per 25 leaves were found on the untreated plants, while throughout the growing season no psyllid nymphs were found on the phorate-treated plants.

In Table II, yield data are shown from these same plots. The untreated plots yielded only 86.5 hundred pound sacks per acre of U. S. No. 1-A potatoes compared with 230 of the hundred pound sacks in the phorate treated plots. The reduced yield of untreated plots resulted from psyllid yellows transmitted through the feeding psyllid nymphs.

New Interest in Chippers

In the past, red potatoes have been the most common commercial variety in Arizona. With the increased demand for and interest in processing, the Kennebec, a white-skinned variety, became the number one potato in 1962.

Comparative data for granular phorate and Di-syston are given in Table III. These materials were applied at planting time to the Kennebec variety. Application was made as described earlier. From this table, it is obvious that all rates of application of either phorate or Di-syston reduced the number of psyllids compared with the untreated plots. In the untreated plots, on one sampling date, up to 1008 psyllid nymphs were found per 25 leaves compared with 62 per 25 leaves where the 10-pound rate was used.

Table II.—Effects of phorate on yield of potatoes, Mesa Branch Station, 1960; variety, Red Pontiac.

U. S. Grade	Yields in 100-lb. Sacks per Acre: Untreated Sacks	Untreated Per cent	Phorate Treated Sacks	Phorate Treated Per cent
No. 1-Jumbo	0.6	0.3	75.3	22.2
No. 1-A	86.5	45.1	230.6	67.9
No. 1-B	91.6	47.8	15.3	4.5
No. 2	4.9	2.5	8.8	2.6
Culls	8.2	4.3	9.8	2.9
Total	191.8		339.8	

In comparing phorate and Di-syston, the 20 and 15-pound rates of these materials gave excellent control of aphids and psyllids. Most effective was the 20-pound rate of phorate, which gave nearly perfect control of psyllids and good control of aphids. The 10-pound rate of either material was not adequate for best control.

20-Pound Rate Best

Yield data from these plots are given in Table IV. Highest total yields were generally obtained where the 20-pound per acre rate was used. Although the 10-pound rate of phorate produced the largest number of sacks per acre of No. 1-A potatoes, the total yield was less. The 10-pound rate also gave poor psyllid nymph control. Where Di-syston was used, the 10-pound rate produced fewer No. 1-A potatoes than did the 15 and 20-pound rates.

In general, results from three years of study with granular systemic insecticides for controlling potato insects, particularly psyllids, show that a 20-pound rate per acre of 10 per cent granular phorate or Di-syston will give season-long control when the materials are properly applied.

Other insecticides will also control

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Table III. — Effects of granular phorate and Di-syston on the control of insects with Kennebec potatoes, 1962[1]

INSECTS PER 25 LEAVES

Sampling Date	10% Phorate Granular 20 lbs./A. Aphids	Psyllids	15 lbs./A. Aphids	Psyllids	10 lbs./A. Aphids	Psyllids	10% Di-syston Granular 20 lbs./A. Aphids	Psyllids	15 lbs./A. Aphids	Psyllids	10 lbs./A. Aphids	Psyllids	Untreated Aphids	Psyllids
Mar. 31	2	0	3	1 A[2]	11	1 A	9	0	2	0	10	1 A	5	1 A
Apr.	34	0	56	0	120	5	45	1	70	2 A	8	1 A	283	16
Apr. 14	29	0	101	3	312	45	44	5	62	14	18	33	1135	518
Apr. 19	5	1	49	0	485	86	15	0	18	3	62	6	3170	722
Apr. 28	6	0	19	0	406	62	3	0	8	3	54	1	4878	1008
May 3	19	0	24	0	688	47	3	0	5	3	33	6	3341	737
May 10	28	0	28	0	170	5	3	0	32	1	17	0	0	39
May 16	32	0	91	0	103	2	10	1	22	0	3	12	3	48

[1]Planted February 6, 1962.
[2]A: adult psyllids.

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psyllids, aphids, and thrips on potatoes. Acceptable materials are sulfur, as a dust; parathion two per cent, plus sulfur, as a dust; and Thiodan, three per cent as a dust or spray (two quarts per acre). Repeated applications may be necessary where these pesticides are used. On the other hand, properly applied granular systemic insecticides need be applied only once, at planting time.

The authors would like to acknowledge the valuable assistance given by insecticide companies in providing insecticides, farmers for providing land and other facilities, and to The University of Arizona Mesa Branch Station personnel for their help in accomplishing cultural procedures and harvesting. Without this assistance, these studies would not have been possible.

Table IV. — Effects of granular phorate and Di-syston on potato yields, 1962.

	100-POUND SACKS PER ACRE						
U. S.	*10% Phorate Granular*			*10% Di-syston Granular*			*Untreated*
Grade	*10 lbs./A*	*15 lbs./A*	*20 lbs./A*	*10 lbs./A*	*15 lbs./A*	*20 lbs./A*	
No. 1-Jumbo	13	26	30	13	29	22	0
No. 1-A	173	158	164	124	186	217	3
No. 2	105	140	150	67	150	107	12
No. 1-B	30	15	15	27	19	15	57
Culls	5	7	10	5	3	2	1
Total	326	346	369	326	387	363	73

Harvested: June 6, 1962.

Prof. Thornber, Former Agric. Dean, Dies at 90

Professor Emeritus John J. Thornber, long a distinguished botanist at The University of Arizona, died Nov. 22 at his Tucson home at the age of 90.

Professor Thornber joined The U of A faculty in 1901 and served as professor of botany until 1921. In that year he became dean of The UA College of Agriculture and continued to direct the college until 1928.

Dr. Richard A. Harvill, president of The U of A, said, "Professor Thornber served The University of Arizona long and well in a number of professional roles. He was unexcelled in knowledge and understanding of the plants and plant ecology of Arizona and the Southwest. The very extensive herbarium collections at the university are largely the results of his interest and efforts."

Prof. Thornber was born in Illinois and was 11 when his parents moved to South Dakota. He attended South Dakota Agricultural College and later received the M.S. degree from the University of Nebraska.

The U of A awarded him its 75th Anniversary Medallion of Merit Nov. 24, 1959, in recognition of his "outstanding service to the state and to the development of the university's teaching and research programs." During his long period of service with The U of A, Prof. Thornber devoted a large part of his time to the study of Arizona flora and built up a herbarium of more than 100,000 plant specimens at the university.

He was the author of "The Grazing Ranges of Arizona," a widely-known bulletin issued by The U of A Agricultural Experiment Station. It was the first comprehensive publication on grazing range management in the state and had unusually wide distribution. He was the author of many other professional publications and co-author, with Margaret Armstrong, of the "Field Book of Western Wildflowers."

For many years Prof. Thornber was active in introducing into the Southwest plants from other countries. It was once estimated that at least 75 per cent of the ornamental plantings on The U of A campus were acquired through his efforts.

In 1911-12, Prof. Thornber was granted a leave by The U of A to study at the Smithsonian Institution and the Asa Gray Herbarium. Upon his return to Arizona he continued study of the depleted grazing ranges in the Southwest. He addressed the National Livestock Association several times on the subject.

Prof. Thornber is survived by his son, John S. Thornber of San Diego; a sister, Miss Jessie Thornberg of Moscow, Idaho; and three brothers. They are Edward Thornber, Eugene, Ore.; Adam Thornber, Mt. Vernon, Wash.; and Harvey Thornber of Hamilton, Mont.

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.

U. S. Agricultural Exports Declining

Elmer L. Menzie and Jimmye S. Hillman

The United States has been and is a major exporter of agricultural products. Fiscal year 1961-62 exports amounted to $5,130 million.

However, the value of agricultural exports relative to the exports of all products has been declining, and currently makes up between 20 and 25 per cent of the total (see chart). Agricultural exports account for approximately 12 per cent of the gross farm income, or about 10 per cent of farm product utilization.

Other measures of the value of agricultural exports demonstrate the importance more dramatically. For instance, exports take from a third to half of all cotton produced and in the past have amounted to over 65 per cent. In recent years wheat exports absorbed about a third of the U. S. crop, but in 1957 were over 50 per cent. Tobacco, barley and rice exports have amounted to 20 to 30 per cent of production. These are major products in U. S. agriculture, contributing the largest share of total income.

Many Resources Employed

On the basis of acreage harvested, the U. S. Department of Agriculture estimated that 17.2 per cent was used for export production in 1960. Production of these exports requires numerous other resources such as labor, machinery, petroleum, chemicals and services. The use of these resources in turn creates employment for their production, all of which makes an important contribution to the economic welfare of the nation.

While the export of agricultural products has been large, and valuable both to agriculture and the economy in general, it has not been sustained without cost. Government action has been required,

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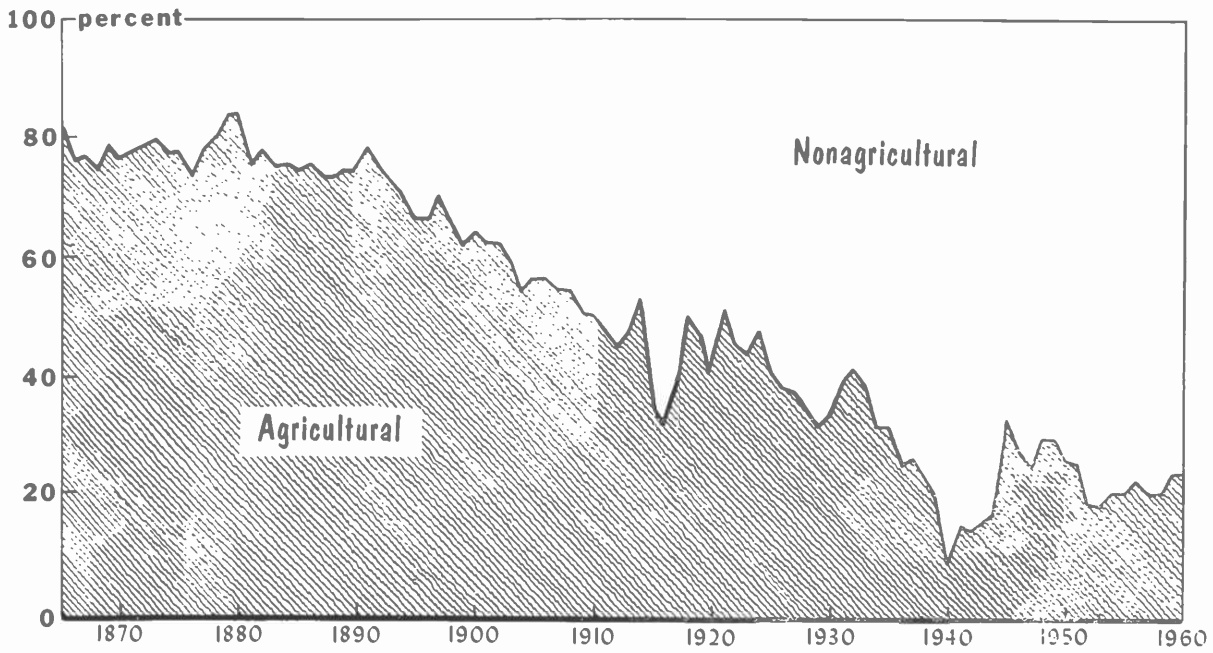
The authors are assistant professor and professor of Agricultural Economics, respectively.



VALUE OF AGRICULTURAL exports as a percentage of all domestic exports, United States, 1885-1960 (Years beginning July 1). Source: U. S. Foreign Agricultural Service.

(Continued from Previous Page)

through payment of export subsidies and the establishment of special programs.

The subsidy on cotton exports in 1961-62 was 8.5 cents per pound, or about 25 per cent of the price received by growers. Export payments on wheat, in recent years, have varied between 50 and 90 cents per bushel. Subsidies are also paid on exports of a number of other agricultural products.

Special Export Programs

Since 1954 over 25 per cent of all U. S. farm exports have been made under special arrangements provided for in the Agricultural Trade Development and Assistance Act, commonly known as PL 480. This provides for sales or gifts to foreign countries by: (1) Acceptance of local currencies, which can be used for specified purposes within the country; (2) Making grants of surplus farm products for famine relief and other assistance; (3) Authorizing domestic and foreign donations and providing for barter of commodities for strategic or other materials; and (4), Sales on long term credit intended to be used for development purposes.

While a number of commodities have been involved, the major transactions under this law have been in cotton and wheat, and sales have been made largely for foreign currencies. For fiscal 1962, 70 per cent of wheat exports, 24 per cent of cotton, and 44 per cent of the milled rice were shipped under PL 480.

There have been problems associated with export programs. Competing countries have complained of unfair competition. There is still much discussion and disagreement as to the real value to receiving nations. Costs to the United States have been relatively large. As of June 1962, the total value of PL 480 programs for eight years of operation amounted to over $17 billion, a large part of which must be written off as either surplus disposal or foreign aid. Debate, therefore, continues over the merit of continuing these programs and for what purpose or goal they should be charged.

Where To From Here?

Undoubtedly agricultural exports will continue to play an important role in the U. S. and world trade. There is a real question, however, as to the level at which these exports should be maintained. Should the U. S. pursue a more positive approach and use its food production capacity to help underdeveloped areas of the world, as has been the indicated direction in recent years?

Alternatively, should a major adjustment be made in resource use and direction of energies? Economics would appear to suggest the latter as the better course of action. However, moral, social and political implications, which must be taken into account, complicate the solution and up to now have produced no apparent clear cut solution.

For a detailed study of special export programs and associated problems see IRM-1 study by Menzie, Witt, Eicher and Hillman entitled *Policy for United States Agricultural Export Surplus Disposal*, Technical Bull. 150, The University of Arizona, August, 1962.

EL FRACASO DEL AGRICOLA RUSA

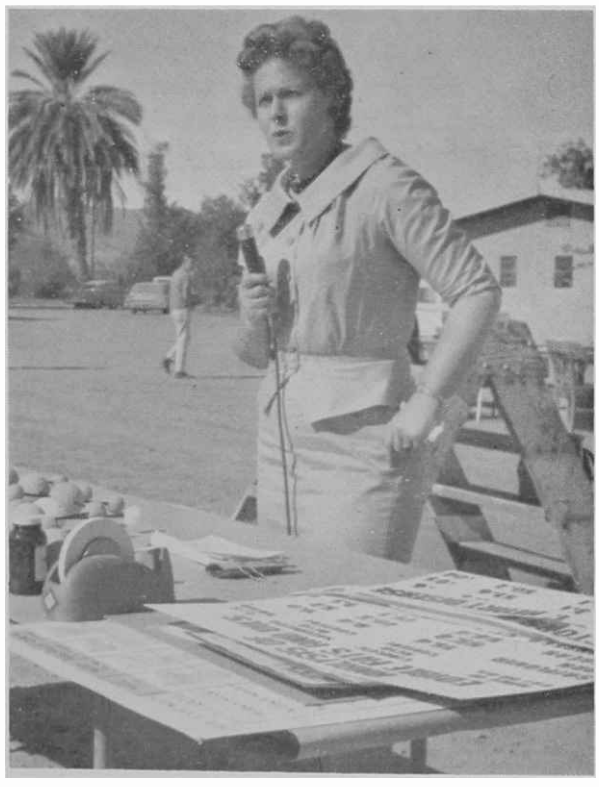
Los fracasos comunistas en su sistema son evidentes. Tras la pantalla de las promesas demagógicas rusas aparece el caos que se ha venido enseñoreando, no sólo de la maquinaria de la propaganda, sino también de la agricultura soviética.

El fracaso de la colectivización agraria rusa lo demuestran sus desastrosos resultados. Los directores políticos de Moscú se han preocupado más por el aspecto propagandístico y demagógico, que por resolver eficazmente el problema de la agricultura. Han abundado las eternas promesas de "una vida mejor" para dentro de veinte años, y se han áchacado los fracasos de la agricultura a condiciones naturales, como las sequías, las plagas, las inundaciones, etc., o bien a las intrigas capitalistas.

Lo curioso es que tales argumentos sólo son válidos para los países del bloque comunista. En iguales condiciones en otros países de los llamados "no comprometidos" o "neutralistas" que tienen fronteras con la Unión Soviética, el índice de la producción agrícola ha sido superior ye en ellos los efectos "lógicos de la naturaleza" no se han observado.

—Antonio Silva, en GACETA AGRICOLA, Navojoa, Sonora, Mexico

Distaff Voice at Yuma Field Day



MISS JUNE GIBBS

A successful 1962 season of spring and fall field days ended with a most successful event Nov. 20 at the Yuma Valley Station. With Supt. Frank Pritchard the able host, information was given by College of Agriculture personnel on cotton, sorghum, alfalfa and other crops.

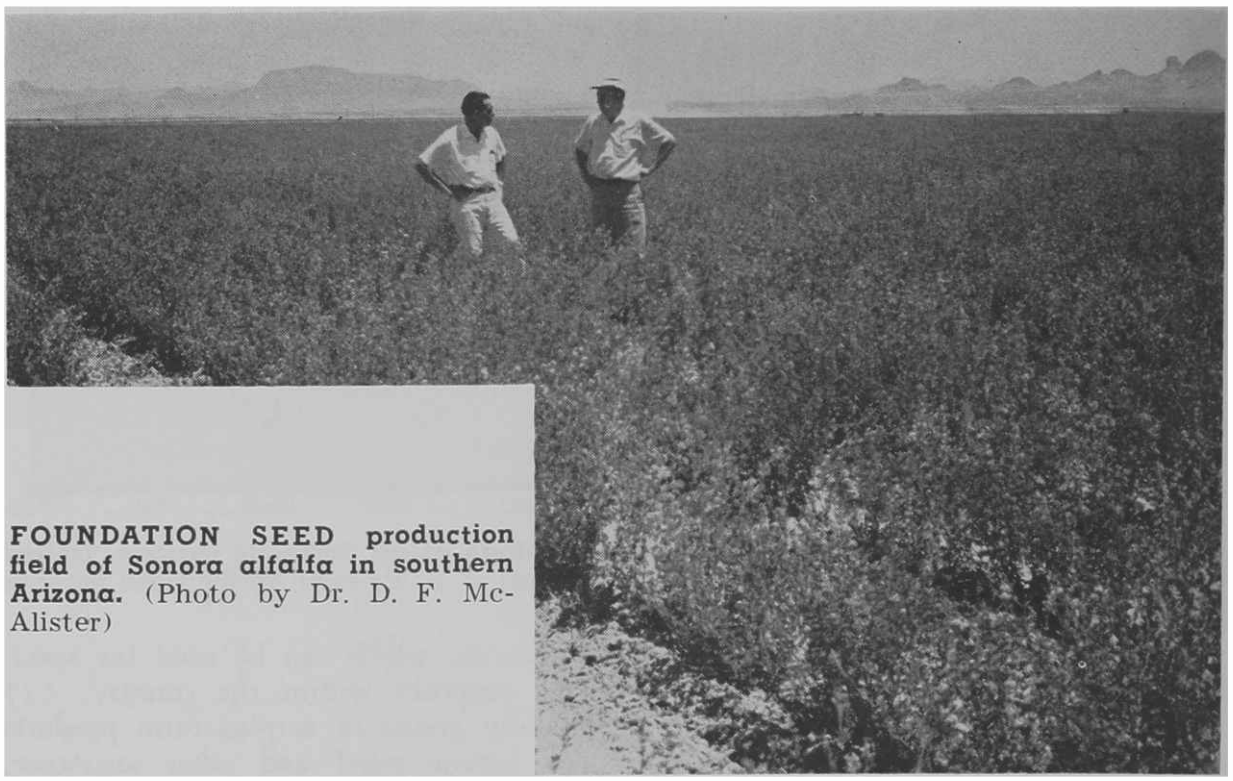
Innovation was a talk by Miss June Gibbs, Extension Nutritionist, who discussed safflower oil as a human food. Advertised well beforehand, the talk attracted a large group of women.

Warner Fisher discussed cotton breeding, Bob Briggs the cotton spacing, K. C. Hamilton weed control and Bob Voigt and Lee Stith discussed sorghum research. Bob Tilt reported on Sonora, the new alfalfa.

County Agent G. E. Blackwell made the commentary during a tour of research plots. Adding greatly to the day were 10 special exhibits arranged by various research and extension personnel.

Sonora - - New Alfalfa for the Southwest

M. H. Schonhorst,
M. W. Nielson and
R. K. Thompson



FOUNDATION SEED production field of Sonora alfalfa in southern Arizona. (Photo by Dr. D. F. McAlister)

A new non-dormant, spotted aphid-resistant alfalfa variety has been developed and released for use in the lower desert valley areas of Arizona, California, and southern Nevada where the varieties African and Moapa are being grown. Presumably the variety will also be adapted to areas in northern Mexico — in the states of Sonora, Sinaloa and Chihuahua — which have similar growing conditions.

This new alfalfa has been named Sonora — after the Sonoran Desert region to which it is well adapted.

Junta of USDA and 3 States

Sonora was developed and tested cooperatively by alfalfa breeders, agronomists, and entomologists of the Arizona, California, and Nevada Agricultural Experiment Stations, and the Crops and Entomology Research Divisions, U. S. Department of Agriculture. Sonora was developed from 13 parent plants selected from the well-known variety African, with the Arizona research scientists making the original combination of parent clones.

Selection of the parent plants of Sonora was based on a number of characteristics considered important for usage as a forage crop in the Southwest. All of the parent plants have resistance to the spotted alfalfa aphid and produce progeny which are equal or superior to existing varieties in forage production under irrigation in the Southwest.

Sonora has produced approximately 10 per cent more forage than other varieties in tests conducted at both the Mesa and Yuma research farms in Arizona and at the University of California's Imperial Valley Field Station at El Centro, California.

Has Seasonal Advantage

The most striking feature of Sonora is its ability to establish a stand rapidly, and to produce forage during the cooler months of the year in the lower desert valley areas. These characteristics are of concern to farmers and ranchers interested in alfalfa production for early spring and late fall grazing or green chopping. During the warm summer months, hay production from Sonora is similar to that of African or Moapa. In test plantings, persistence of Sonora has been equal, or superior, to that of African.

During the early spring of 1962, a relatively heavy infection of downy mildew occurred on alfalfa in the Salt River Valley. Under these conditions, plants of Sonora appeared to be somewhat less susceptible than those of Moapa and African grown on test plots on The University of Arizona's Mesa Branch Station.

Sonora appears to be equal to African or Moapa as a seed producer. Seed yields have been satisfactory in both experimental and commercial plantings.

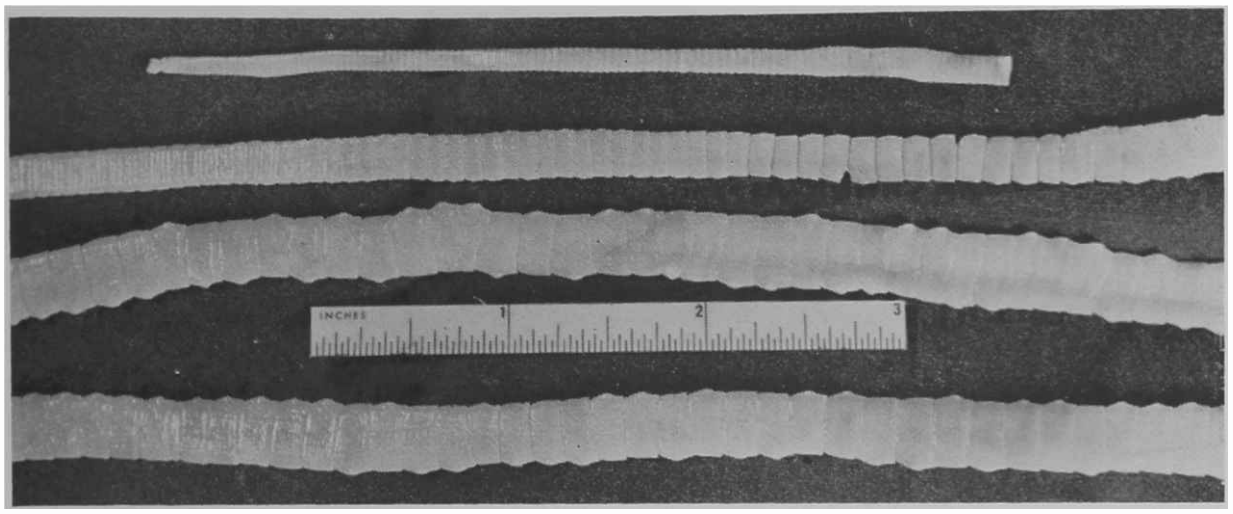
Seed Will Be Available

A limited supply of foundation seed of Sonora was produced in Arizona in 1962 and can be obtained from the secretaries of the Arizona and California Crop Improvement Associations. Certified seed will be available in the fall of 1963. There will be no registered class of Sonora. There will be enough foundation seed available so that there will be no need for production of registered seed.

BELOW, SMALL RESEARCH plots used to evaluate parental plants of Sonora, at The U of A Mesa Branch Experiment Station.

Dr. Schonhorst is an associate agronomist in the Department of Agronomy, University of Arizona, specializing in alfalfa work. Dr. Nielson is an entomologist in the Entomology Research Division, Agricultural Research Service, U. S. Department of Agriculture. Rex Thompson is a research associate in Agronomy, University of Arizona, stationed at the Mesa, Ariz., Branch Experiment Station.

"Communism is most conspicuous for its failure in agriculture. It is doubtful if Premier Krushchev can do much to remedy his agricultural problem until he finally faces the fact that agriculture is a highly individualized human activity requiring expert personal interest, pride, and management by the farmer-owner himself."—The American Banker.



AT LEFT, portions of the human tapeworm. Such a tapeworm may exceed 40 feet in length in the human.

Seeking To Identify Beef Measles In Live Meat Animals

L. W. Dewhirst and J. D. Cramer

The term "beef measles" has no similarity to the term "measles" as it is used in relation to humans. It refers instead to the intermediate stage of a human tapeworm, *Taenia saginata*, which is found in cattle.

The adult tapeworm resides in the intestines of humans and utilizes food which the human digests for it. This particular kind of tapeworm may exceed 40 feet in length in a human! The tapeworm produces eggs which pass out of the human's body with the fecal material. As many as 1,000,000 eggs may be produced in a single day. If deposited in a field or along an irrigation ditch, they may ultimately be found on the grass or in the water. As such, they would be accessible to cattle and could accidentally be taken in by cattle when eating or drinking.

Deposits of human waste along irrigation ditches, or at roadsides, are not uncommon near labor camps or adjoining fields where laborers are employed at a considerable distance from sanitary facilities.

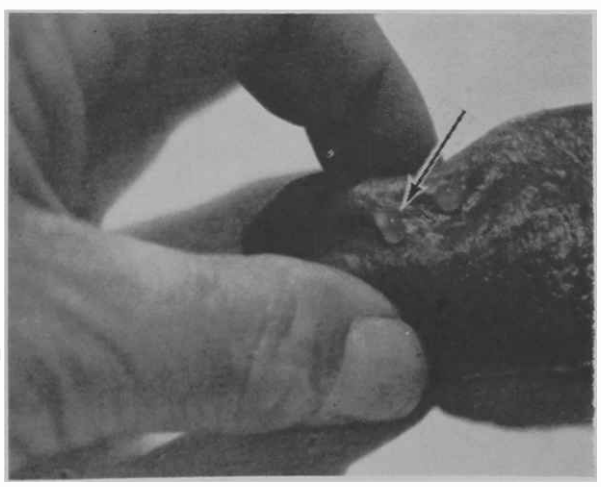
Deposited in Beef Muscle

In cattle, each tapeworm egg transforms into a small white fluid-filled sac or cysticercus which is found in the muscle tissue. The appearance of the small white cysticerci in the red muscle gave rise to the term "beef measles."

It can easily be seen that a bovine, if it encounters one tapeworm egg, may come in contact with many thousands of eggs. Similarly, if the source of infection is present for one animal, it is present for all animals in a given pasture. Therefore, if one infected animal is encountered in a herd, it is likely that quite a high percentage will be infected. Infection rates in such a herd may be as high as 50 per cent, or even higher in some cases.

Federal inspection of meat detects most infected carcasses so that the public is fairly well protected. It is possible, however, that some lightly infected beef can reach the consumer's table. If not sufficiently cooked, each small cysticercus could cause an adult human tapeworm.

BEEF MEASLES, shown below in a piece of meat from a steer infected with the intermediate stage of the human tapeworm. The arrow points to one of the immature tapeworms. Humans may become infected with a tapeworm by eating such meat if it is insufficiently cooked.



SWELLING REACTION, outlined in black, which an infected steer showed to skin test for beef measles.

Doesn't Show Up Visually

Research on this problem at The University of Arizona has shown that infected cattle show no symptoms of being infected. They gain properly and look as healthy as those which are not infected. Consequently, most infected animals are fattened and sent to market only to be condemned or retained for processing. Either way, the producer loses money.

In order to protect the consumer more adequately and to prevent the cattle feeder from needless waste in feeding infected cattle, research is being conducted by University of Arizona personnel to try to find some way of identifying infected cattle before they are slaughtered.

Best results so far have been with several immunological tests similar to those used in the diagnosis of certain other diseases. Among the most promising to date have been an intradermal test (similar to the tuberculin test) and a hemagglutination test. Both tests need further study before they will be completely reliable.

Studies Are Continuing

Other possibilities are being explored in the hope that other even more specific tests may be discovered. Corollary studies have shown that it is not practical to hold infected animals with the thought that the cysticerci will die and be re-absorbed. Cysticerci were found to be still alive in a steer almost two years after it had been artificially infected.

Dr. Dewhirst is an associate professor and Mr. Cramer a research assistant, both in the Department of Animal Pathology. All photos by Dr. Dewhirst.

12 Years of Sprinkler Irrigation Research

K. R. Frost

The Agricultural Engineering Department of The University of Arizona has been studying performance characteristics of sprinkler irrigation systems since 1950. These studies have evaluated water application efficiencies and the factors affecting water losses, crop yields and water requirements over a wide range of crops, climatic conditions and sprinkler system operation. The most important studies and their results are summarized here.

The first studies determined the losses of water from a sprinkler spray as the water passed through the air from the nozzle to the soil or plant cover. The results of these tests were combined into a nomograph (Figure 1) which may be used for estimation of spray losses for any combination of operating conditions. Examination of the nomograph shows that spray losses (per cent evaporation loss in Figure 1) increase with increasing air temperatures, nozzle pressures and wind velocities; and decrease with increases in relative humidity and nozzle diameter.

Measuring Water Losses

After spray losses were determined, studies were undertaken to measure the water losses from the plant and soil surfaces during sprinkling. These studies have led to the development of a weighing evapotranspirometer. This device can detect application or evaporation of as little as 1/100 inch of water on an area of soil or growing crops 12 feet in diameter. Tests performed on bare soil indicate that surface evaporation during sprinkling varies widely but generally increases with wind, air temperature and degree of wetting.

Evaporation from bare soil surfaces during sprinkling has been approximately equal to spray losses. Evaporation losses from plant surfaces during sprinkling have been found to equal evapo-transpiration which would have occurred had the plants not been sprinkled. Thus this evaporation from the wet plant surfaces is not a net loss from the sprinkler application. The bar graph of Figure 2 gives both spray and ground losses during sprinkling under typical conditions. These studies are continuing and will result in detailed loss information similar to that which has been developed for spray losses.

A third group of studies has evaluated the response of a number of crops to sprinkler irrigation in comparison with surface irrigation. The crops have included alfalfa, sorghum, winter grain, cotton and citrus. The accompanying table summarizes the results of these tests.

Light Sprinkling For Grain

Crop yields per unit of water have not shown a consistent pattern favoring either day or night sprinkling. The grain and forage crops have given slightly higher yields with light frequent sprinkling than with heavier applications made infrequently. Water requirements for light, frequent irrigations during the day were generally less than for other treatments, and yields per acre foot of water have been generally higher under sprinkler application of water than under surface irrigation on soils of low water holding capacity.

Young lemon trees on Superstition Sand are being grown under sprinkler

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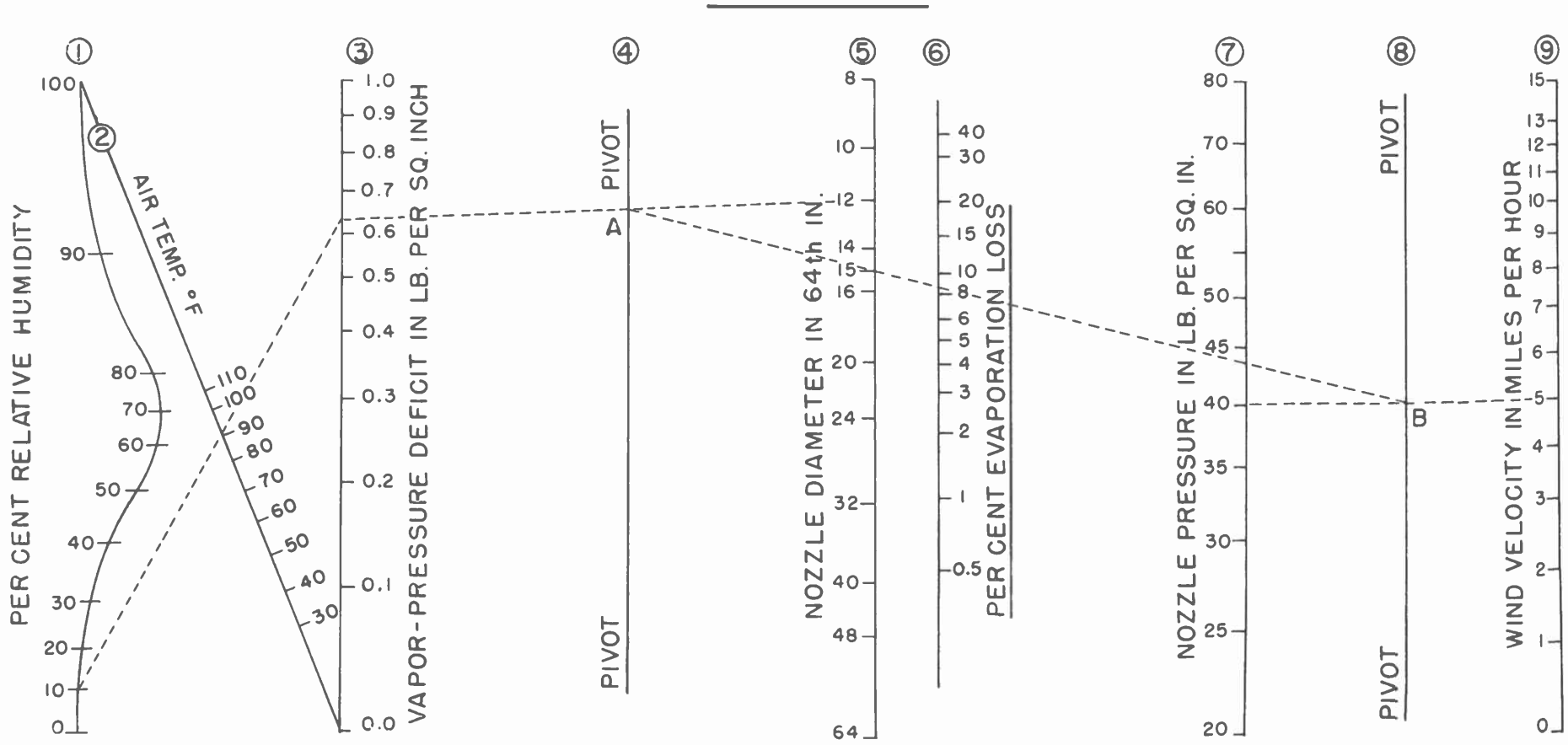
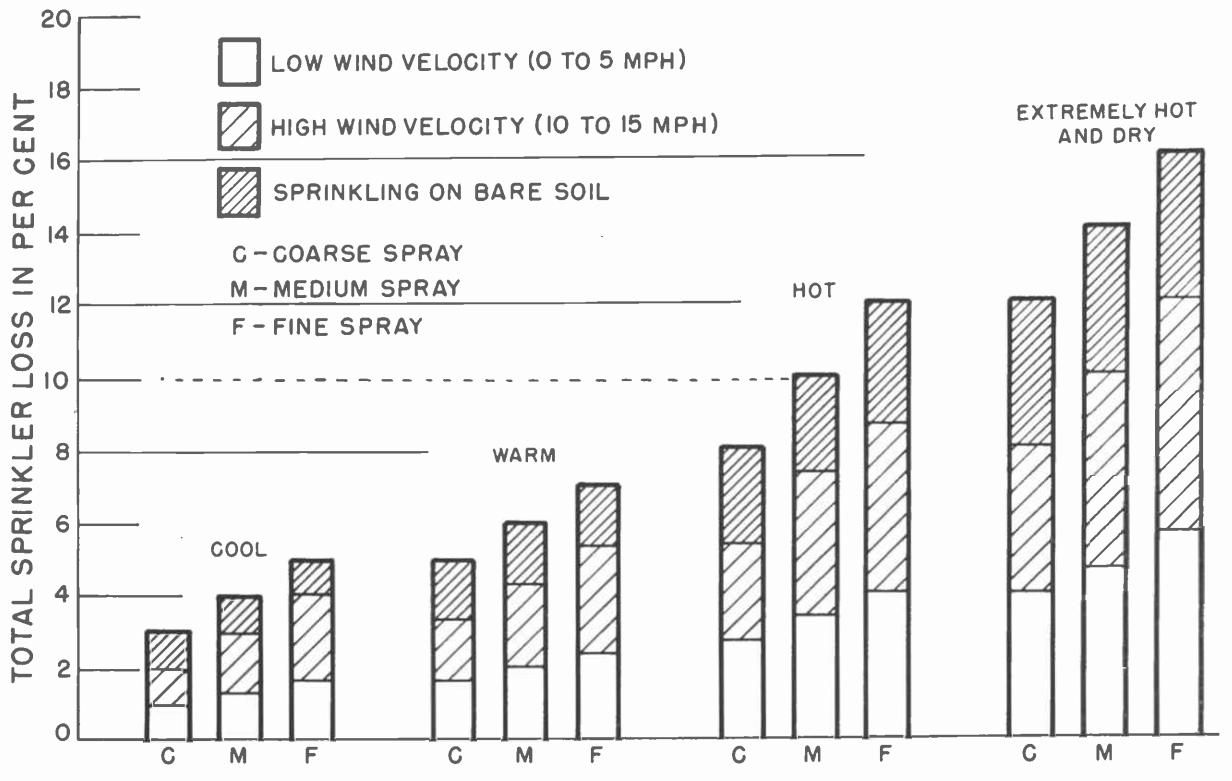
The author is agricultural engineer in the Agricultural Experiment Station.

BELOW, NOMOGRAPH used in estimating spray losses at known climatic and operating conditions. Average daytime conditions for the operating period should be used. Night operation losses can be disregarded unless wind velocities are high. Example shown by the dotted line gives the losses for 10% relative humidity and 90°F air temperature, resulting in vapor pressure deficit of 0.73 psi. Line drawn from 0.73 psi to the nozzle size 12/64" determines point A on line 4. Line drawn from the wind velocity of 5 m.p.h. to the nozzle pressure of 40 psi determines point B on line 8. A line drawn from A to B intersects line 6 at the per cent spray loss.



BAR GRAPH for estimating total losses when conditions are estimated. This graph is useful to learn both spray losses and losses occurring after the spray reaches the soil surface. Total loss sprinkling on bare soil at high wind velocities, in hot weather and using a medium spray, is shown by the broken line at about 10%.



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irrigation with one-half the water application required in adjoining plots under surface irrigation.

Sprinklers Save Water

In summary, practical field results in crop production trials have agreed with results of studies of evaporation loss from spray, soil and plants. Irrigation water can generally be saved by the installation of a properly designed sprinkler system, especially on the lighter soils.

January

1-5 —Arizona National Livestock Show, Phoenix
9-11—Agric. Ammonia Institute, Westward Ho, Phoenix
10-11—Beltwide Cotton Production Conference, Dallas, Texas
17-18—Winter Meeting Arizona Section, American Society of Range Management, Nogales
23—Arizona Water Resources Committee, UA Campus
25-26—4th Annual Pest Control Conference, U of A Campus
28-31—Annual Extension Service Conference, Student Union Bldg., U of A Campus
30—11th Annual Meeting, Arizona Poultry Federation, ASU, Tempe

February

4-22—Western Regional Extension Winter School, UA Campus
13-14—6th Annual Arizona Fertilizer Conference, Senior Ballroom, Student Union Bldg., U of A Campus
18—Annual Meeting Arizona Crop Improvement Association, Ramada Motel, Phoenix
19—Annual Meeting, Arizona Cotton Growers, Phoenix
25—2nd Annual Sale at Arizona Beef Cattle Improvement Station, The University of Arizona River Road Farm, Tucson

March

5- 6—Western Cotton Production Conference, Phoenix
16—FFA Field Day, U of A Campus

Results From Sprinkler and Surface Irrigation

Crop	*Treatment**	*Yield*	*Ac. Ft./Ac.*	*Yield per Ac. Ft.*
		Tons/Ac.		T./A. Ft.
Alfalfa (3 yr. av.)	spr. frequent (day)	5.51	3.01	1.83
	spr. reg. day	5.33	2.94	1.81
	reg. night	5.70	3.70	1.54
	flood	5.27	5.31	1.00
		Tons/Ac.		T./A. Ft.
Winter Grain 1960	spr. frequent (day)	4.05	1.10	3.70
	spr. reg. day	3.24	1.10	3.00
	spr. reg. night	3.70	1.07	3.50
	flood	3.54	1.66	2.20
		Tons/Ac.		T./A. Ft.
Winter Grain 1961	spr. frequent (day)	2.48	0.85	2.92
	spr. reg. day	2.14	1.00	2.14
	reg. spr. night	2.14	1.10	1.87
	flood	2.48	1.52	1.64
		Tons/Ac.		T./A. Ft.
Sorghum (forage)	spr. frequent (day)	21.9	1.91	11.5
	spr. reg. day	20.5	2.21	9.3
	spr. reg. night	25.8	2.31	11.2
	furrow	24.3	2.32	10.5
		lb./seed cot./Ac.		lbs./A. Ft.
Cotton A-44	spr. frequent (day)	2560	3.59	713
	spr. reg. day	2740	4.55	600
	spr. reg. night	3015	5.06	623
	furrow	2980	5.49	543
		lb./seed cot./Ac.		lbs./A. Ft.
Cotton				
A-44	sprinkler	2942	3.15	934
A-44	furrow	2941	4.09	720
D.P.	sprinkler	3192	3.15	1133
D.P.	furrow	3310	4.09	807
Lisbon Lemons (1961) (4 yr. old trees)	sprinkler		4.8	
	flood		9.5	

*All tests were in quadruplicate.

Policing Pesticides

James M. Witt

There has been a growing concern on the part of some segments of the public over the alleged undue exposure of the population to technological hazards resulting from technological advances. The target of much of this concern is the use of pesticide chemicals in the production of food crops. There is a fear on the part of some persons that the use of such chemicals is profligate, unwarranted, uncontrolled and of no concern to the manufacturers and users of such chemicals.

Nothing could be farther from the truth. Although pesticides are essential

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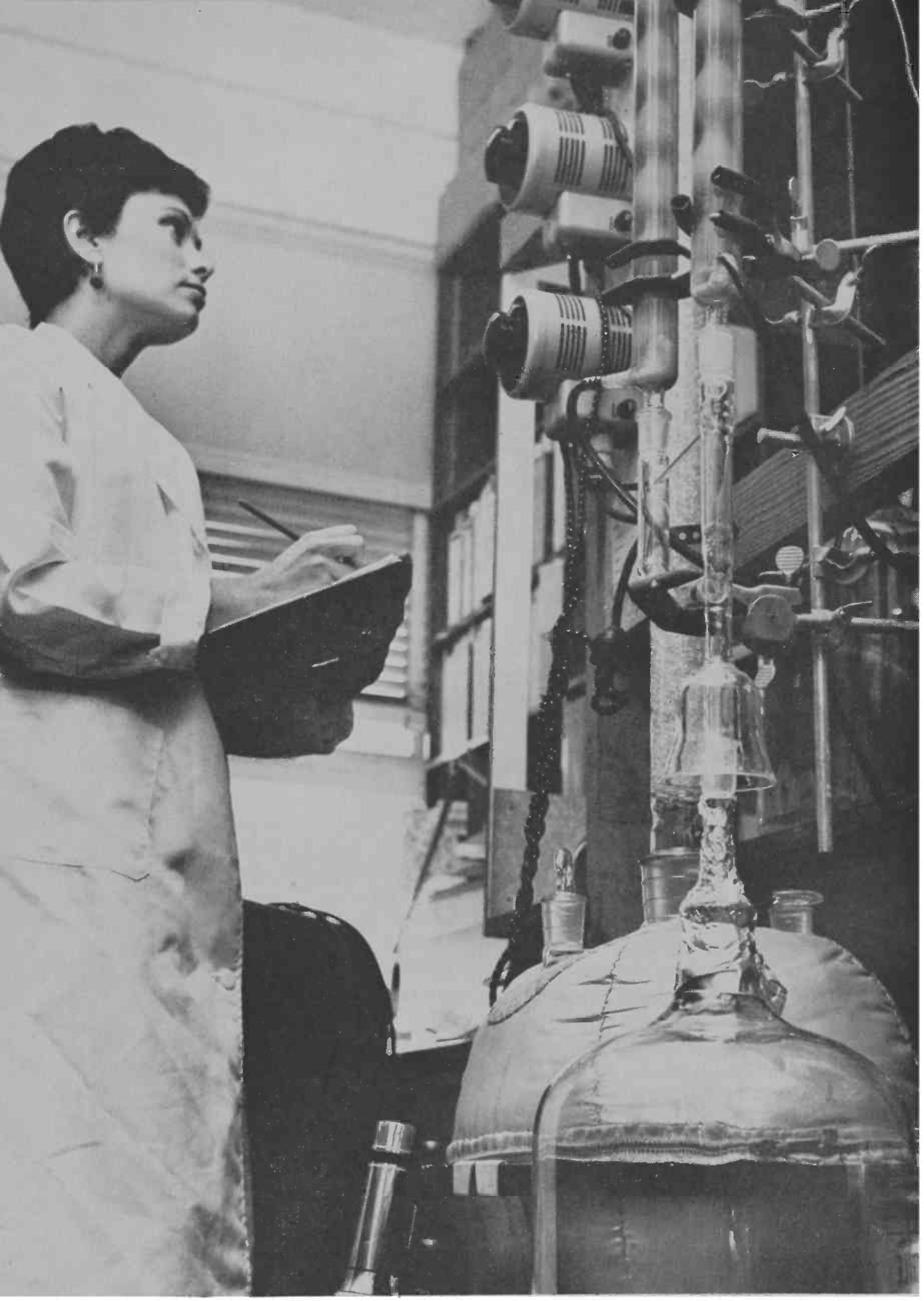
Dr. Witt is an associate professor in the Department of Entomology, in charge of the pesticide residue laboratory in that department.



THE INSECT TOXICOLOGY laboratory carries out extensive investigations to assure that agricultural use of insecticides does not ever pose a threat to the health of the people of Arizona. Foods are being studied carefully to make sure that recommended insect control practices do not result in a hazardous amount of insecticide remaining on the food. First step is to extract any insecticide that may be present, using a mixture of organic solvents. Then these solvents must be especially redistilled prior to use, as shown in this photo, otherwise small amounts of impurities will interfere with the detection of the minute amounts of insecticides.

Atoms, Aspirins and Autos, Too

As mankind develops new learning he forges new tools for his use or protection. But these new inventions carry their own hazards, requiring great care in their use. This is true of nuclear energy in defense and industry, of powerful new drugs, faster automobiles and also agricultural chemicals. It is a tribute to civilization if we learn the precautions as rapidly as we learn the new uses. We have done that in the field of agricultural chemicals.

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for the protection of most food crops, the public is largely unaware of the research, legal safeguards and precautionary practices involved in the protection of our population from the improper use of pesticides.

Strict Tests and Controls

No insecticide, or other pesticide, can be used in this country until (a) the U. S. Department of Agriculture has shown that it is *useful* and (b) the U. S. Food and Drug Administration has been shown that such use will not in any way constitute a threat to the safety of the consumer.

These requirements are not mere platitudes, but are regulations which require a great many experiments proving that there is a safe level for insecticides on food crops, and that the proposed use will result in only 1/10th or 1/100th of this safe amount. This fraction of the safe amount is established as the maximum legal amount of the insecticide permitted on the crop and is called the "tolerance."

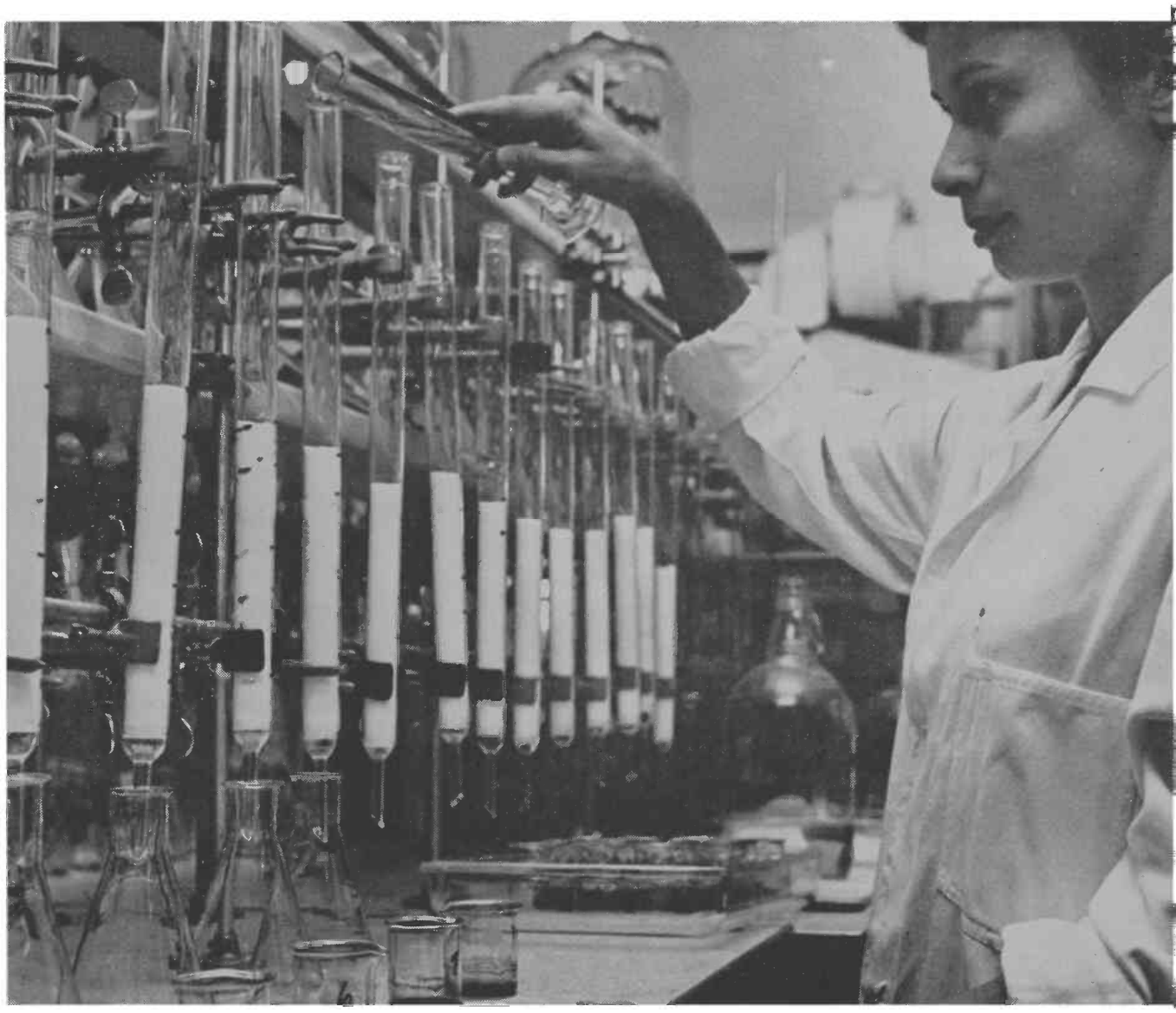
The Department of Entomology is carrying on a program to make certain that any of the insecticide treatments which are recommended by The University of Arizona for use on Arizona crops will result in insecticide residues at harvest which are below the tolerances established by the Food and Drug Administration. This guarantee of safety to the public is very much the concern of every entomologist, as well as of growers and pesticide manufacturers.

Extensive Trials by UA

Before recommending a particular insecticide for use on a crop, University of Arizona entomologists conduct extensive experiments to show that the treatment will result in effective control of a particular pest and that this treatment will not result in an unwanted side effect.

Efficient control of the target pest is only one of three legs on which an insect control recommendation must stand. It must also produce minimal ecological disturbances and must result in a harvest residue of the insecticide which is below the legally established safe amount. Two or three years of experiments are usually necessary in order to adequately establish all these points.

It is possible to use essential pesticides and still produce crops with harvest residues below the prescribed legal tolerances because of the tendency for most pesticides to quickly disappear, due to volatility, weathering, mechanical loss, growth dilution, and degradation reactions. Ninety per cent of most organic pesticides, including the so-called persistent ones such as DDT, will disappear from crops in less than two weeks. Figure I shows the rapid rate at which DDT disappears from a crop such as lettuce. As a general rule, half of the pesticide material will disappear from the crop every three or four days.



FURTHER CHEMICAL purification steps are necessary to separate the plant or animal fats and waxes from the insecticide. A final purification step, shown in the photo above, to remove the last traces of fats and waxes, is to pass the extract through a special sand in a chromatography column with organic solvents designed to carry through the insecticide, but leave behind all other materials. After this process the purified insecticide which was extracted from the food is injected into a microcoulometric gas chromatogram designed to detect and identify as little as a three hundred-millionth of an ounce of insecticide.

Is Dissipated Quickly

At an ordinary rate of use (1.5 pounds per acre) the DDT residues on the lettuce fell to below the tolerance of seven parts per million in less than a week. Even at a much higher dosage rate (five pounds per acre) than is necessary, recommended or registered, the residue fell below the seven parts per million tolerance within three weeks. In order to provide a large margin of safety, in case of some unusual behavior, registration regulations require the DDT must not be applied to lettuce any closer to harvest than the seedling stage — eight to 12 weeks before harvest.

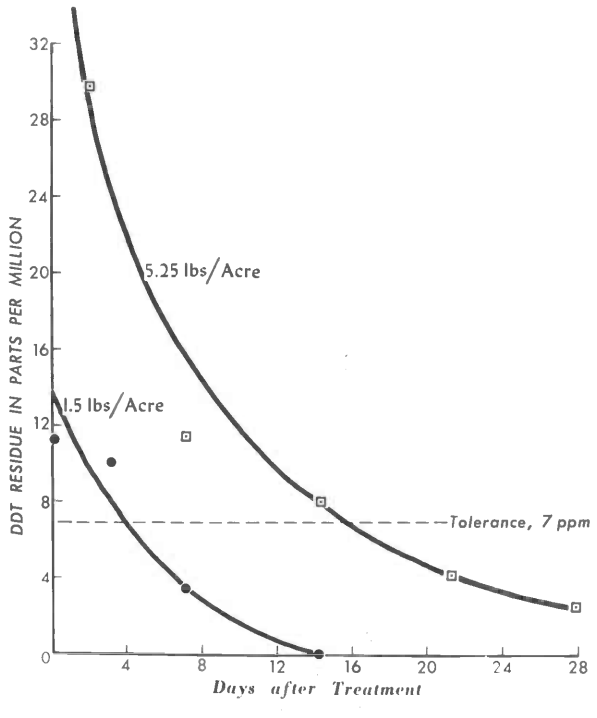


FIGURE I — Rate of disappearance of DDT from lettuce in Arizona.

The legal tolerance applies to the entire lettuce head as it is shipped to market. However, it should also be noted (Figure II) that most of the insecticide residue which does remain on a head of lettuce is on the outside, or "wrapper," leaves which are thrown away after shipping. Thus, an ever increasing margin of safety is constantly applied for the protection of the public.

The Pesticide Residue Laboratory in the Department of Entomology is constantly carrying out studies, such as those illustrated in Figure I and II, in coordination with the insect control experiments conducted by research entomologists under field conditions, to make sure that

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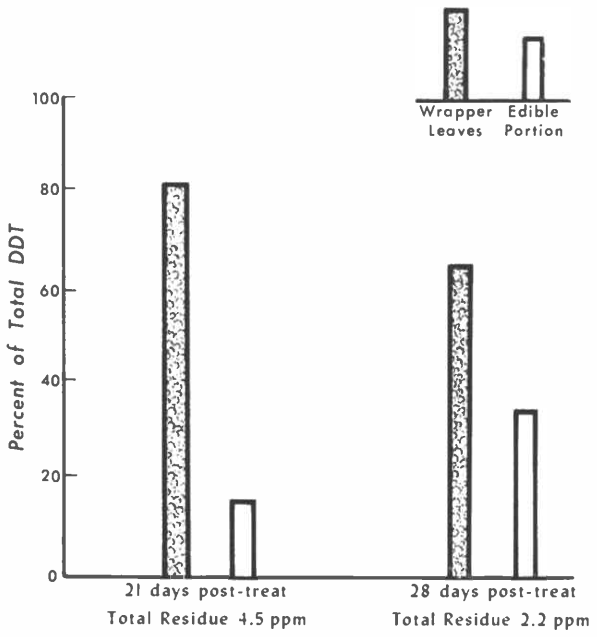

FIGURE II — Distribution of DDT residue within the lettuce head.

University of Arizona insect control recommendations will not result in pesticide residues at harvest higher than the legal tolerances.

It's Nationwide Effort

The work of The University of Arizona laboratory represents a small part of a nationwide effort by entomologists, chemists, public officials, and manufacturers, to make pesticides both useful and safe. The introduction of effective insecticides and the development of safe methods for their use has permitted man to manipulate nature for his own great benefit. Progress has been slow, as each pesticide is carefully studied before being approved and recommended for use, in order that every possibility of adverse side effects may be understood and eliminated.

The quality and quantity of our food have been increased, untold lives have been saved by the eradication or control of disease vectors, and modern living has been made better in many other ways. If man were as carefully protected against all hazards of modern living as he is against the hazards from improper use of pesticides, "the world around us" would surely be almost perfect.

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87 Beef Bulls Entered In Test-Gain Trials

The University of Arizona's second annual bull testing program is now going on at the River Road Farm, north of Tucson, where the Arizona Beef Cattle Improvement Station is located.

E. Ray Cowden, first vice-president of the Arizona Cattle Growers' Association, is chairman of the advisory board. Dr. Bruce Taylor of The U of A is in charge of the program.

Eighty-seven bulls in seven different breeds, and from 26 different registered herds throughout Arizona, are on a 130-day test. Four bulls came 10 days earlier to comply with Performance Registry International standards.

There are 60 Herefords, 4 Polled Herefords, 9 Brangus, 6 Santa Gertrudis, 4 Charolais, 2 Angus, and 2 Shorthorn.

The ages of the bulls run from December 1, 1961, to March 31, 1962, and their weight varies from the 408 pound smallest to a 911 pound animal. Herds represented:

Angus Cattle
The University of Arizona, Tucson

Brangus Cattle
Bruce Church Ranches, Inc., Yuma
Empirita Ranch, Benson
Yuma Valley Cattle Company, Yuma

Charbray Cattle
Van Horn Ranch, Ehrenberg

Hereford Herds
Apache Tribal Enterprises, San Carlos
Bar T Bar, Flagstaff
R. F. Burnett & Son, Elfrida
Cowden Livestock Co., Phoenix
Elgin Hereford Ranch, Elgin
Hooper Hereford Ranch, Springerville
I V Bar Ranch, Douglas
Jay Six Ranch, Benson
Las Vegas Ranch, Prescott
Long Meadow Ranch, Prescott
Lucky Draw Hereford Ranch, Snowflake
Merry Meadows Ranch, Tucson
Rancho Sacatal, Dos Cabazas
Smoke Tree Ranch, Kirkland
Swinging H Ranch, Elgin
Heady-Ashburn Ranch, Patagonia
Las Delicias Ranch, Tucson
The University of Arizona, Tucson

Polled Herefords
W Diamond Ranch, Skull Valley

Santa Gertrudis Herds
Ki-He-Kah, Tumacacori
San Cayetano, Tumacacori

Short Horn Herds
Heiden & Son, Buckeye

The test will close Feb. 21. Those bulls will be awarded "diplomas" that gained an average of 2.3 pounds per day for the 130-day period, plus maintaining a required rating.

Flood Control on Frye Creek

Frye Creek in Graham County is like an old farm horse most of the year, but when the floods come this old horse kicks up its heels — or did until the Soil Conservation Service fashioned a harness.

That harness is a flood control dam near Thatcher, where flood waters can be held and gradually released into a flowway which carries these waters to the Gila River. Above, a group of foreign visitors to the U. S. stands by the outlet of Frye Creek dam, and at left is the partially-completed channel which carries outlet waters to the Gila River.

Dr. Fred Turner, superintendent of the Safford Branch Experiment Station, part of The University of Arizona's College of Agriculture, took the above picture.

UA Scientists Watching Boll Weevil Damage In Northern Sonora Fields

G. T. Bottger and George P. Wene

For the past two years the boll weevil (*Anthonomus grandis* Boheman) has caused serious economic damage to cotton in an area in Mexico, the northern limits of which extend within 30 to 35 miles of Nogales, Arizona.

A survey made on October 1, 1962, showed that every cotton field between the towns of Nogales and Caborca, Mexico, was infested with the boll weevil. The infestation nearest to Arizona was about 30 miles. Losses in these fields were estimated to be as great as one to one and one-fourth bales of cotton per acre.

The weevils causing this damage in northern Sonora cannot yet be distinguished from those that cause three-fourths of all insect damage to cotton in the southeastern United States. The weevils in Sonora deposit eggs in both squares and bolls, just as the weevils in the southeastern United States do.

Southwest States Fortunate

Fortunately, Arizona, New Mexico, and California, as well as parts of western Texas, have escaped the establishment of the boll weevil that causes serious economic damage to cultivated cotton in the southeastern United States. Instead, at least in Arizona, the thurberia weevil (*Anthonomus grandis thurberiae* Pierce) is found. However, this weevil has never maintained itself successfuly in Arizona cultivated cotton, although it breeds in wild cotton (*Gossypium thurberi*).

Thurberia weevils were reported to be infesting domestic cotton in southern Arizona as early as 1913. Since then this weevil has been found and reported in the Santa Cruz Valley nearly every year. In 1931, weevils were found as far north as Eloy, and in 1959 specimens were recovered from cultivated cotton in Maricopa, Yuma, Pinal, Pima, and Cochise counties.

Mr. Bottger is leader of Western Cotton Insects Investigations, ARS, USDA. Dr. Wene is University of Arizona Cotton Entomologist at the UA Cotton Research Center.

Detected In September

That the weevils in Arizona have usually not ben observed in cultivated cotton until about the first of September, and then only in small numbers, indicates that such infestations result from their over-wintering in the small bolls of *G. thurberi* plants. These weevils are not released from their cells until the bolls and cells are softened by moisture from the summer rains. Their late appearance and small numbers usually preclude any serious damage.

The occurrence of thurberia weevil infestations in central Arizona in 1959 and the unusually heavy infestations in the Santa Cruz Valley in 1961, together with the recent movement of the damaging boll weevil into West Texas, have been of interest to persons involved in cotton-insect research. These infestations have alerted entomologists, concerned with protecting cotton from insects, to the potential menace of the boll weevil which ravages domestic cotton as far north as it is grown in northern Sonora and which, as was previously pointed out, infests cotton crops situated so close to the Arizona border.

Which Weevil Is It?

To protect Arizona and California growers from the serious boll weevil losses now occurring annually only a few miles away, we must determine whether these weevils are inherently different in their habits. Is the weevil in Sonora the same as the boll weevil infesting the crops in the southeastern United States? Or is it simply the thurberia weevil which has adapted itself to domestic cotton under Mexican farm practices?

To answer these questions, University of Arizona and USDA scientists have initiated ecological studies of these weevils and will continue them until sufficient information is accumulated to insure protection of western cotton from the menace of the weevils in Mexico.

Results of cage tests at the Entomology Research Division's cotton insect laboratory at Tucson show that the thurberia weevil behaves as follows: (1) Oviposits on domestic cotton just as readily as on the wild cotton, *Gossypium thurberi*; (2) completes its development in domestic cotton squares as well as bolls, just as the boll weevil does in the southeastern United States; (3) begins ovipositing within seven days after release from cells whether it be in January in a greenhouse or in July in a greenhouse or in the field; (4) does *not* overwinter in ground trash as does the boll weevil in the southeastern United States.

Found Early In August

In northern Sonora, biweekly weevil counts beginning in midsummer revealed that all stages of weevils were present in cotton by August 1. About 20 per cent of the squares were punctured by weevils of the second generation. On August 30, infestations of new squares had reached 100 per cent in many fields with 20 to 30 per cent losses in yield indicated. By October 1 losses in some fields ranged from one-fourth to one and one-fourth bales of cotton per acre.

Reid New Head Of UA Poultry Department

Dr. Bobby L. Reid of Tucson has been approved as the new head of the Poultry Science Department at The University of Arizona by the state Board of Regents.

Reid has been an associate professor of poultry science and associate poultry scientist at the university since Feb. 1, 1960, doing both research work and teaching. He replaces Dr. Al Kurnick, who has gone into commercial work in California.

A native of South Texas, Reid received his bachelor's, master's and doctorate degrees at Texas A & M College. His Ph.D. degree was in biochemisrty and nutrition.

After teaching two and one-half years in Texas A & M's poultry department, Reid went to Pillsbury Co., Clinton, Iowa, as products research manager of the feed division. He came to Arizona after a year there.

The new department head did two nutrition studies abroad — one in Turkey and another in Haiti. In 1957 he served as a biochemist for three months on a nutrition survey team for the Turkish armed forces. Next year, he helped with a similar nutrition survey of the population of Haiti for the Research Corp., a part of the Williams-Watterman Foundation, New York.

Reid has had 35 formal research papers published in scientific journals.

Testing Roses

Joe Folkner and Lee Burkhart

ATTRACTIVE ENTRANCE to the rose test garden. That large beam, by the way, came from a railroad trestle at Hayden, Ariz.

Nearly three years ago the Tucson City Parks and Recreation Department, in cooperation with the Horticulture Department of The University of Arizona, initiated the establishment of a rose variety test garden. This is a research project to test new varieties of roses, cultural practices under desert conditions, and as a public service.

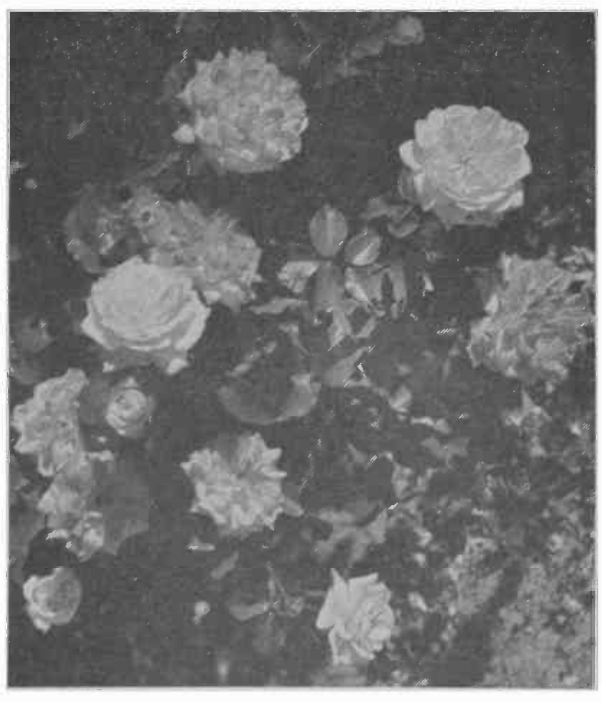
A favorable site was selected in Randolph Park, the city's largest. A large number of people, including winter visitors, visit the garden each year. Home owners in the urban and suburban areas will benefit from the rose test garden, which will continue to have increasing local and state recognition.

Extensive preparation of the area was provided by Gene Reid, Division of Parks and Recreation. The entire garden, a little over an acre in size, was excavated to a depth of three feet. This material which contained some caliche was removed. The backfill was virgin desert soil mixed with large quantities of composted stable manure. The irrigation system is of the overhead sprinkler type, which may be controlled manually or by automatic controls.

This garden consists of 222 plots, 10 plants of each variety. All of the award-winning varieties of the past three years are included and also many yet un-named varieties.

Most of the plants have been donated by various hybridizers, growers and garden clubs. Others were purchased. The garden will be completed this spring, with 31 plots yet to be planted. Some of these are replants of varieties which did not thrive under desert conditions.

Dr. Burkhart is head, and Mr. Folkner a member, of the Horticulture Department.



"EASTER PARADE" is name of this floribunda rose, aptly named for its abundance of color and variability of appearance at different stages of flower opening.

GARDEN IS PLANTED by type of rose rather than color. Mass of bloom occurs in spring and fall.

More Pictures of

ROSES

"DUET," A HYBRID prize-winning tea rose, is shown in photo at right. Below, an over-all view of the rose garden. In deep center can be seen the overhead rotating sprinkler.

180,000 Saguaro Seeds Out; More Available

Remember back in September when PROGRESSIVE AGRICULTURE carried an article about growing saguaro cacti, with an offer of free saguaro seeds?

Well, if all the seed ordered by our readers were to grow, this would be a land of vast saguaro forests.

Dr. Edwin B. Kurtz of the Botany Department, who wrote the article and offered the seeds, tells us that more than 600 readers have asked for packets of seeds. "With an average of 300 seeds in a packet, that is starting a lot of baby saguaros on their way," he notes.

Dr. Kurtz says that, quite naturally, the greatest number of inquiries have come from Arizona, but there has been a large number from California, with fewer requests from several other states.

Foreign requests which he has answered will introduce the saguaro cactus to Czechoslovakia, Hungary, Israel, the Philippines and other countries. In many cases the requests came from school children, and cactus-growing projects are thriving now in school rooms in Arizona and other states.

Dr. Kurtz still has seed available, in case you missed out in the first go-round. He will send it free, together with planting directions. Write:

Dr. E. B. Kurtz, Dept. of Botany
University of Arizona, Tucson

Please send me a package of saguaro seed and planting directions.

Name.....

Street.....

City.....**State**.....

Vets Honor Bill Pistor

A beloved College of Agriculture professor, Dr. W. J. Pistor, head of the Department of Animal Pathology, was honored by his professional associates recently, as the Arizona Veterinary Medicine Assn. gave him a "service award" plaque.

Thus the state's veterinarians have joined UA student groups which, on different occasions, have honored a man whose influence has touched the hearts of students and adults as well as their minds.

Bill Pistor is a native of Arizona, born in Tucson, who graduated from this same College of Agriculture where subsequently he has taught and conducted research for nearly thirty years. A former member of the Tucson City Council, he is currently a member of the city school board.

"American agriculture has given us a food-producing capacity that may prove to be the most potent of all weapons of the cold war — and the most effective of all deterrents to hot war. If a stalemate exists in the area of weapons of destruction, we still hold an immense advantage in the crucial area of food production, an advantage that the men elsewhere who could push the fateful button may well consider to be decisive."— Agriculture Secretary Orville Freeman.

Sugar Beets Featured at Yuma Field Day

Sugar beets drew the spotlight at the fall field day at The University of Arizona Yuma Branch Experiment Station, causing visitors to ask about the future of this crop in Arizona.

Giant beets, which had been in the ground since June, were pulled up for exhibit. Visitors also saw fields where sugar beets are planted year around, on a given date each month.

Arizona has asked for a permanent allotment of at least 65,000 tons of sugar beets. This request was presented in Washington, D. C., by Floyd Smith of Phoenix, chairman of the governor's committee on sugar beets. Dr. Harold Myers, dean, U of A Agriculture College, also assisted with technical information at these hearings. Currently, the U. S. Dept. of Agriculture is studying the matter.

Sugar beets have been grown successfully in Cochise, Graham, Maricopa and Yuma counties, according to U of A agronomists. For example, in Yuma last year sugar beets yielded on the average 32.9 tons an acre.

"We've had average yields over the years of 33 tons per acre from four varieties of sugar beets. Some plots produced up to 40 tons," explained Dr. Ernest Jackson, U of A associate agronomist, Yuma.

"Sugar content of the beets," Jackson added, "has averaged 19 per cent, which is a little higher than in California's Imperial Valley." The sugar beets produced at Yuma at present are used in livestock feeding tests.

Recommendations about planting and fertilizing sugar beets are quite well worked out, Jackson said. The crop usually is dusted once each year with DDT to control leafhoppers. However, damage to the beets from leafhoppers has been of minor importance.

"The US-H2 variety has produced our highest yields, ranging from 22.9 tons with no nitrogen fertilization to over 34 tons per acre when 275 pounds of nitrogen was applied," Jackson said.