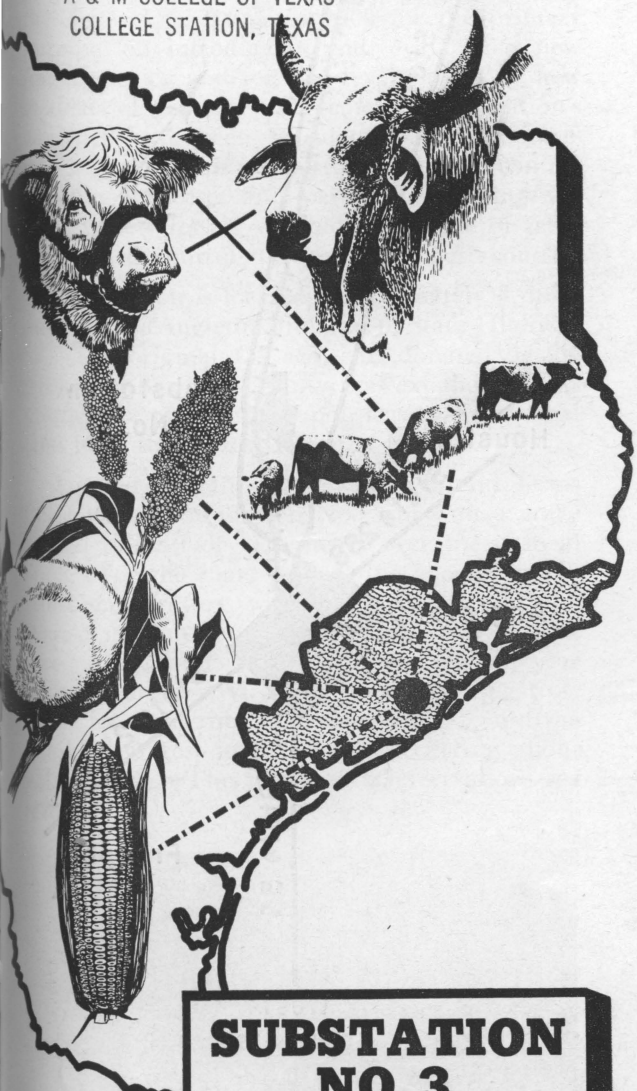
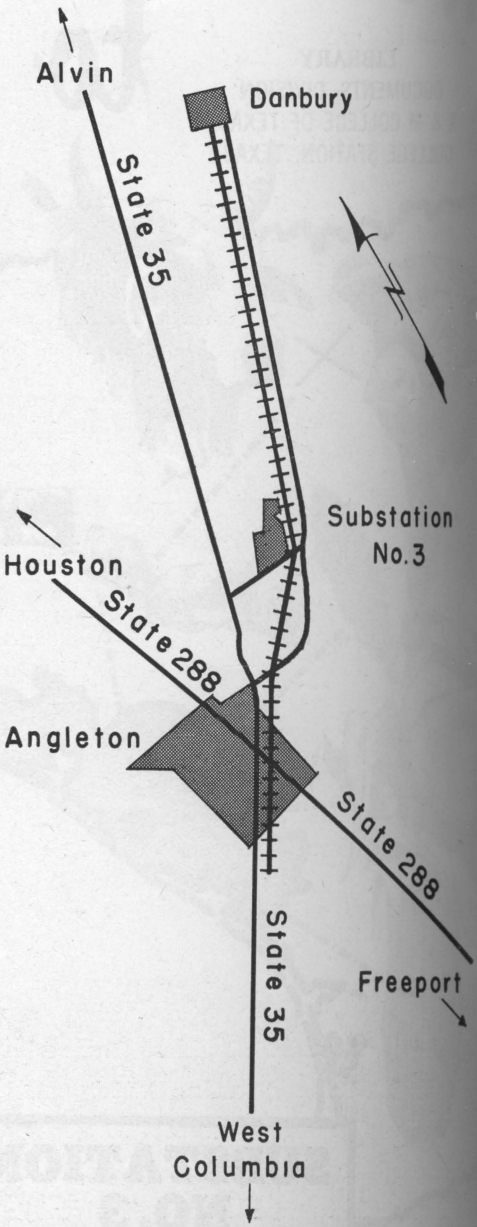
Welcome to



SUBSTATION NO. 3

Angleton, Texas



Highways to Substation No. 3,
Angleton, Texas

Welcome

to the

TEXAS AGRICULTURAL EXPERIMENT STATION

Substation No. 3--Angleton

Substation No. 3, generally known as the Angleton Experiment Station, was established by the Texas Legislature in 1909 for the primary purpose of introducing and evaluating new forage species, and for the development of new methods of pasture management. The station's activities have been broadened to include research in the fields of livestock breeding, control of animal diseases and parasites, cropping systems, variety testing of field crops, use of fertilizers, insect control and weed and brush control.

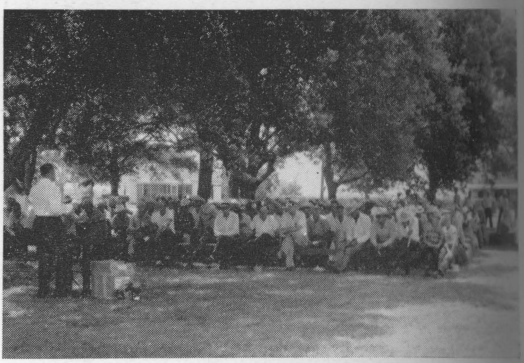
The station is located approximately 3 miles northeast of Angleton and east of State Highway 35. The original 159 acre site, donated by the citizens of Brazoria County, was expanded to its present size of 567 acres upon lease of additional land from the Texas Company in 1941.

Located near the center of the humid Texas Coast Prairie, Substation No. 3 had an average annual rainfall of 47.9 inches over the past 46 years. For the same period, the average maximum temperature was 79.7 degrees, and the average minimum temperature was 59.1 degrees. The average annual growing season for a 45-year period was 284 days, with the first killing frost in the fall occurring about December 2, and the last killing frost in the spring occurring about February 21. The station is 23 feet above sea level.

Aerial view of Substation No. 3 headquarters.

The area of the Coast Prairie is approximately 7,500,000 acres. The terrain is nearly level with slow surface drainage. Upland soils, originally covered with tall bunch grasses, are dark colored, neutral to slightly acid clay loams and clays, with some lighter colored sandy loams. Acid soils are mostly east of the Trinity River. The main soil series are Lake Charles, Beaumont, Edna, Bernard, Hockley and Katy. The hardwood bottomlands are reddish-brown to dark-gray calcareous clay loams and clays. The main bottomland series are Miller, Norwood and Pledger. Soils on the station are principally Lake Charles clay with some Edna clay loam.

Numerous agricultural meetings, demonstrations and tours are conducted by station personnel throughout the year. Visitors from many foreign lands as well as from each state in the union find a hearty welcome at the Angleton Experiment Station. The mailing address is Angleton, Texas, and the phone number is TI 9-7361.



Highlight of the station's yearly activities is its annual field day which is normally held during the latter part of June.

Personnel of Substation No. 3

James C. Smith, *Superintendent*

George E. Cauthen, *Associate Veterinarian*

James B. Henson, *Assistant Veterinarian*

Brook E. Jeter, Jr., *Assistant Agronomist*

Marvin E. Riewe, *Assistant Agronomist*

Eloise T. Hart, *Secretary*

John H. Craig, Jr., *Technician I*

Stanley Griffin, *Technician II*

Agricultural Research Projects at Substation No. 3

LIVESTOCK BREEDING

Over the United States as a whole, beef producers generally prefer high-grade cattle. Most commercial herds using common or mixed cattle as foundation stock employ a system of up-grading by using purebred bulls of European breeds such as the Hereford, Angus or Shorthorn. This is not true along the entire Texas Gulf Coast where environmental factors of warm, humid climate, low altitude, prevalence of parasites and diseases and the poor quality of native forage contributed to early importation of Brahman cattle from India.

Progress in pasture improvement and disease and parasite control has lessened the need for Brahman blood. A livestock breeding program is being conducted at the Angleton Station to determine the effect of hybrid vigor on beef production in the Gulf Coast area. In this long range study, rotational crossing of five breeds—Angus, Brahman, Charolais, Hereford and Shorthorn—is compared with purebred Herefords and Brahmans. Carcass evaluation studies are made on half of the steer calves at weaning time. The

Gulf ryegrass is harvested at different stages of growth, dehydrated, pelletized and fed to beef cattle in quality evaluation studies. Grasses are fed in pellet form to eliminate waste in feeding.

remaining steers are used in pasture management studies, then finished in a drylot to evaluate locally grown feed rations before final carcass evaluations are made. Records kept include reproductive performance, weaning weights, growth weights after weaning, and carcass and meat characteristics of the cattle.

Information gained in this study should result in more efficient utilization of feed and forage produced in the area.

FORAGE RESEARCH

Introduction of New Species

Grasses capable of producing large yields of high quality forage are essential to economic beef production on the Coast Prairie. In an effort to find such grasses, more than 60 species and strains are grown at the substation. Among the more important are Angletongrass from India, Dallisgrass and Bahiagrass from South America, Buffelgrass from Africa and Hardinggrass from Australia. Native grasses, hybrid developments such as Coastal Bermudagrass, and numerous legumes are also grown. The most promising legume has been Louisiana S1 white clover.

Once adaptation is proved, research is carried into the second phase. Yield potential, water and fertilizer requirements, resistance to diseases

Exhaustive tests are conducted with grasses and legumes from every continent in a ceaseless search for better forage plants.

and insects, and establishment and maintenance requirements are studied more closely. At this point, many introductions are weeded out for one cause or another.

Surviving introductions are subjected to exhaustive tests to determine their yield under practical grazing conditions.

In the newly initiated fourth phase of the forage research program, an effort is made to discover what factors in a grass or legume control its ability to produce beef or milk. The beef producing ability of grasses now grown on the Coast Prairie varies from less than 100 pounds to more than 2,000 pounds per acre. Working cooperatively with this station to determine the cause of this wide variation are the Departments of Agronomy, Biochemistry and Nutrition, Dairy Science and Animal Husbandry of the Agricultural and Mechanical College of Texas.

Establishment of Perennial Pastures

Research to determine cultural and fertilizer treatments necessary for the satisfactory establishment of Dallisgrass, Bermudagrass and clover pastures reveals the following major steps as minimum requirements: (1) elimination of competing vegetation prior to seeding; (2) provision for adequate surface drainage, and (3) application of at least 60 pounds of available phosphoric acid per acre.

Fertilizer Studies

Tests at this station show that pastures may be maintained indefinitely with the application of 30 to 40 pounds of available phosphoric acid per acre annually. Not only is phosphorus beneficial to grasses, but it is essential for optimum growth of clover on prairie soils.

Grasses respond markedly to applications of nitrogen, but in varying degrees. In one study with four common introduced species, the response to nitrogen was greatest from Coastal Bermudagrass and least from Angletongrass. Common Bermudagrass and Dallisgrass were intermediate in response.

Forage plants have shown no response to potash on clay soils and only slight response on the lighter-textured soils.

Lime is required on highly acid soils in the area, particularly for satisfactory legume growth. A soil test is recommended as the basis for determining lime and fertilizer needs.

Establishing Temporary Pastures

Temporary winter pastures continue to be an important consideration in year-round grazing programs since no fully satisfactory cool-season perennial grass is presently available. Small grains and Gulf ryegrass planted on well prepared seedbeds or in rice stubble provide maximum cool-season grazing. Legumes seeded with annual winter pastures for soil improvement do not eliminate the need for nitrogen fertilizer to increase forage production during late fall and winter. To alleviate the problem of grazing small grains during prolonged periods of rainy weather, a portion of summer-growing sod pasture, such as Bermudagrass, is interplanted with small grain. These plantings are made after the sod is dormant, and liberal applications of nitrogen and phosphorus are required for optimum growth.

Pasture Management

The proper utilization of forage during periods of peak production is the key to realization of maximum profit from fertilized tame pastures.

Three systems of grazing management were begun in 1956 to determine the most efficient method of utilizing lush spring growth on Dallisgrass-white clover pastures. These systems include: (1) moderate continuous grazing at a stocking rate which the pasture can maintain throughout the growing season; (2) heavy continuous grazing with reduced stocking rate in periods of low production and (3) rotational grazing to permit the removal of excess forage as hay or silage. The greatest gain per acre was obtained from heavy continuous grazing; at no time, however, was the pasture overgrazed. Lowest per acre gains were obtained from rotational grazing. This apparently was a result of lowered nutritional value of the available forage since the protein content declined more rapidly than on pastures grazed continuously. Heavy spring use of Dallasgrass-white clover pastures is accomplished with a cow-calf program with fall calving.

ANIMAL HEALTH

The well-watered, grassy Coast Prairie of Texas is one of the most important cattle producing areas of the nation. Unfortunately, the same environmental conditions which permit large populations of cattle also contribute to the prevalence and spread of livestock diseases and parasites.

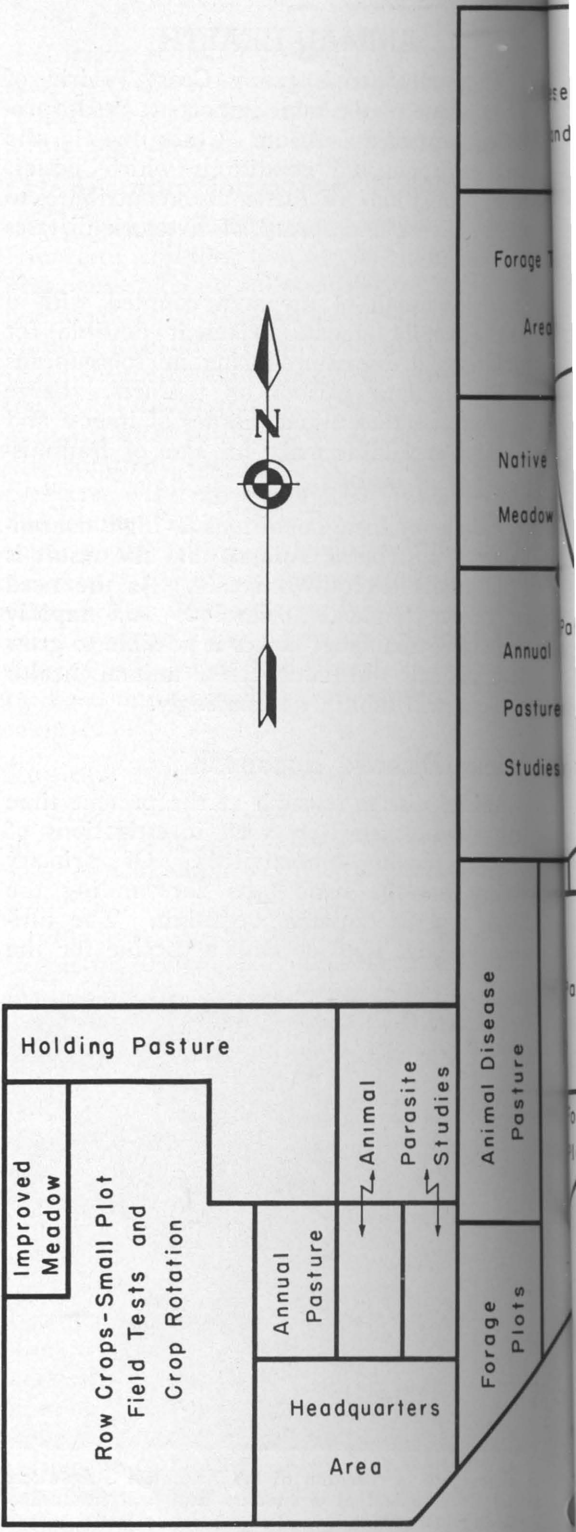
High rainfall of the area coupled with a relatively mild climate makes it possible for parasites and disease-producing microorganisms to live for long periods on pastures. Large amounts of surface water, hordes of insects and a variety of wildlife make for ease of transmission of many diseases.

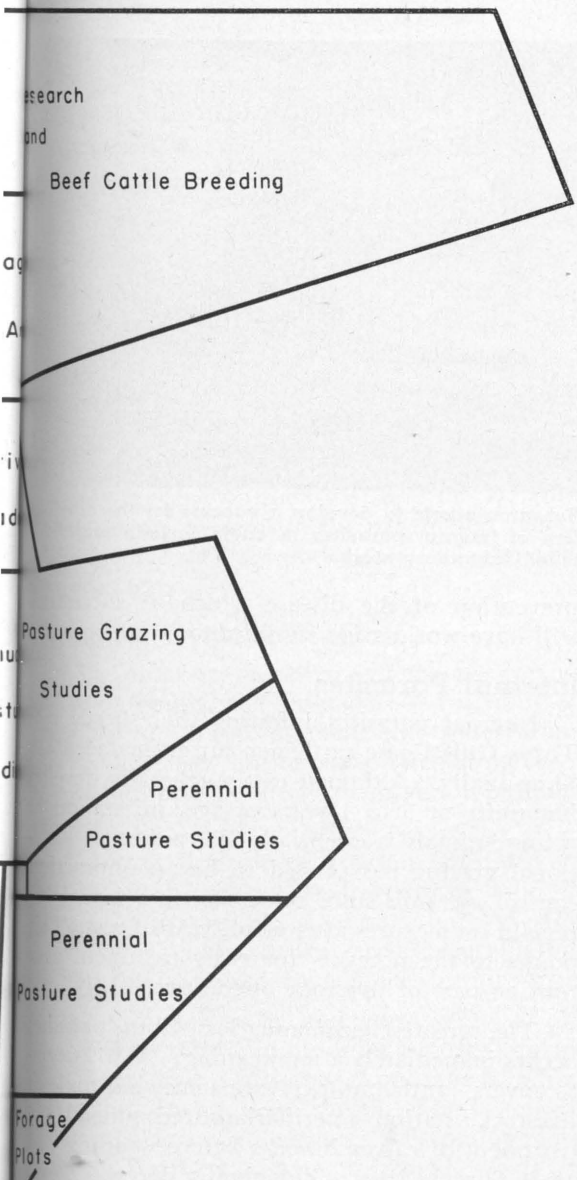
Include in these conditions a high concentration of susceptible animals and the result is a potentially explosive mixture. As the need for greater production develops and rapidly progressing technology makes it possible to grow more animals on fewer acres, animal health problems will multiply accordingly.

Animal Disease Research

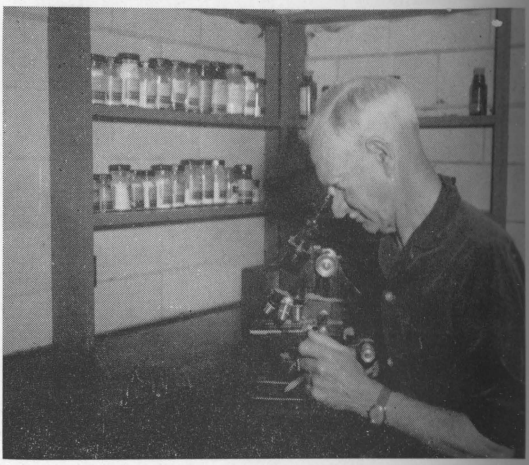
Animal disease research at the present time deals almost exclusively with investigations of pinkeye (keratoconjunctivitis). Of primary concern are the basic facts surrounding the disease and its causative organism. The ultimate objective is to develop a vaccine for the

A major goal of research at the Angleton Substation is the development of a vaccine that will immunize cattle against pinkeye.


N
Native Meadow
Annual Pasture Studies
Holding Pasture
Improved Meadow
Row Crops-Small Plot Field Tests and Crop Rotation
Animal Parasite Studies
Annual Pasture
Headquarters Area
Animal Disease Pasture
Forage Plots



SUBSTATION NO. 3
ANGLETON, TEXAS



Research efforts to develop a vaccine for the elimination of internal parasites in cattle include much detailed laboratory work.

prevention of the disease which, if successful, will have world wide significance.

Internal Parasites

Internal parasites infesting their herds cost Texas Gulf Coast cattlemen an estimated $3 to $4 annually. Although cattle generally develop immunity at 3 to 4 years of age, infestation in young animals is essentially 100 percent. Rotational grazing has proved to be an impractical control measure since some parasites invariably remain on pastures after a full year of rest. This points to the necessity for early treatment as a routine part of livestock operations.

The greatest economic loss from parasites occurs immediately after weaning. As all worm-removers (anthelmintics) are somewhat toxic to livestock, station veterinarians recommend the treatment of calves 2 weeks before weaning and again 6 weeks later. This timing prevents weaning setback and treatment setback occurring at the same time.

Since parasites are becoming resistant to many drugs commonly used as anthelmintics, this represents what may well be the most important animal health problem in the area.

Parasite research at the Angleton Station involves both treatment and prevention. Various compounds are tested in an effort to develop new and efficient anthelmintics with relatively non-toxic effects to the animal. The major

effort involves research into a possible method of immunizing cattle against parasites. Two species of small stomach worm and one intestinal worm, most important of the parasite offenders, are included in this study. The worms are treated with X-rays and the sterile larvae are used to infect parasite-free calves. Immunity produced by these worms will be evaluated with the final objective of developing a vaccine which, if successful, may solve the area's multimillion dollar parasite problem.

MANAGEMENT OF FIELD CROPS

All research activities at the Angleton Station are aimed at solving problems confronting the livestock industry on the Coast Prairie. Detailed management problems in the production of feed stuffs for livestock are under study in numerous row crop tests.

Cropping System Studies

Nine different cropping systems are carried out to determine the influence of rotations on grain yields, soil improvement and conservation. They range from continuous soil-depleting crops to rotations incorporating intensive soil-building practices.

A cotton-corn-cowpea rotation initiated in 1913 is one of the oldest tests of its kind in Texas. Continuous plantings of cotton and corn, used as check plots, permit accurate evaluation of crop rotations and commercial fertilizers.

In other tests, corn and grain sorghum are rotated with soil-building crops of oats, Sudangrass, fescuegrass, Dallisgrass, Louisiana S1 white clover and Hubam sweet clover. The beneficial effects of legumes in rotations are becoming more apparent each year with increased yields of grain. Cropping systems containing Dallisgrass and Louisiana S1 white clover have produced the largest increase in corn and grain sorghum yields.

FERTILIZER STUDIES

Corn

Extensive studies on the effects of commercial fertilizer and plant spacing reveal a ratio of 3-1-0 (three parts nitrogen, one part phosphoric acid and no potash) generally will give the best results on corn. Highest yields were produced

with 90 pounds of nitrogen and 30 pounds of available phosphoric acid per acre. Fertilizer applications should be made at or before planting time on Lake Charles clay. Sidedressing was less profitable on heavy clay soils than on loose sandy soils. Plant spacing which gave best results was 18 inches apart in 40-inch rows.

Grain Sorghum

In various tests using different combinations and amounts of nitrogen, phosphorus and potash, the most profitable yields of grain sorghum were produced with nitrogen alone. The rate of 90 pounds of nitrogen per acre appears most practical. Phosphorus, when applied alone, decreased yields in all cases. A combination of 90 pounds of nitrogen and 60 pounds of available phosphoric acid produced the highest yield. Grain sorghum has made no response to potash on Lake Charles clay.

VARIETY TESTING

Cotton

Hundreds of varieties and strains of cotton have been tested to determine their performance in this area in relation to production and to the needs of the cotton industry. Fiber and spinning characteristics of the lint, and oil and protein content of the seed are evaluated. Thirty varieties currently are undergoing performance tests in cooperation with the Texas Department of Correction at Sugarland. In addition, local farmers and county agents are cooperating in three separate field tests.

Varieties most widely produced in this area are Deltapine 15, Deltapine TPSA, Empire WR, Stoneville 2B and Delfos 9169. Under normal conditions, these varieties produce 1 to 1½ bales per acre without irrigation and 1½ to 3 bales per acre under irrigation. Several new varieties currently undergoing extensive testing show promise of economic importance to cotton farmers on the Coast Prairie.

Corn

Over 150 varieties and strains of corn are tested each year at the Angleton Station. Extensive records kept on each variety include dates of germination, tasseling, silking and maturity; degree of insect and disease infestation; weight

Exhibiting a high degree of resistance to the sugarcane borer, Texas 34 is recommended over all other corn hybrids for the Coast Prairie.

and length of ears; shelling percentage, and yields per acre of ear and shelled corn.

The following hybrids consistently have been good producers: Texas 28, 30, 32, 34 and 36. The top white hybrids have been Texas 17W and Asgrow 101W. Recommended over all other hybrids, however, is the relatively new Texas 34. High yields of this yellow hybrid are due in part to its greater degree of resistance to lodging, diseases and insects, particularly the sugarcane borer.

Grain Sorghum

Grain sorghum hybrids have increased yields 20 to 40 percent over the ordinary varieties. Top producing hybrids tested at the station are RS-610, RS-608, RS-630, RS-650, DeKalb C44a and E56a. These hybrids are early maturing, have

Grain sorghum tests include 74 varieties and strains. Their adaptation and performance are studied under coastal climatic conditions.

good standing ability, combine well, and are resistant to many diseases and insects. Their palatable stalks are suitable for livestock feed.

Sesame

Cultivated from Biblical times for its seed and oil, sesame has not been produced commercially in Texas until recent years because of the excessive amount of hand labor involved in harvesting the old, shattering varieties. The Texas Agricultural Experiment Station and the U. S. Department of Agriculture have developed non-shattering varieties, making sesame adapted to mechanical harvesting. Comprehensive yield and management tests of these new and old varieties are carried out at the Angleton Station. These tests have indicated that sesame may well become a valuable cash crop for the Texas Gulf Coast area.

CONTROL OF SUGARCANE BORER

The steadily increasing population of the sugarcane borer is becoming a critical problem for Coast Prairie farmers. This insect, scourge of the area's once vast sugarcane industry, is now seriously menacing corn and grain sorghum crops. Since 1956, research conducted jointly by the Angleton Station and the USDA Agricultural Research Service, Entomology Research Division, is aimed at finding an effective and economical control for the sugarcane borer in corn.

Insecticidal treatments used in these tests include 100 percent Ryanie dust applied at the rate of 15 pounds per acre; 2½ percent Endrin dust at 40 pounds per acre, and 2 percent Endrin dust at 50 pounds per acre. Four applications of each insecticide were made with a hand duster at weekly intervals beginning when the corn was 18 inches tall. The complete control obtained with Endrin resulted in a three-fold increase in corn production over the untreated check plot. Although all treatments gave satisfactory control, none of them is economically feasible for commercial use at the present time. These tests, however, have provided a valuable foundation for future studies.

WEED AND BRUSH CONTROL

Weed Control in Corn and Grain Sorghum

Research on the chemical control of weeds in corn and grain sorghum was initiated in 1959 as a cooperative effort between the Angleton Station and Substation No. 4 at Beaumont. Results of the first year's tests were very encouraging.

Of all chemicals tested, Simazine showed the most promise in both fertilized and non-fertilized plots of corn and grain sorghum. The chemically treated corn plots received no cultivation from planting to harvesting; grain sorghum was laid-by with one cultivation and both crops were 100 percent weed-free.

In the non-fertilized tests, Simazine increased corn yields 118 percent and grain sorghum 35 percent over the control plots which were cultivated three times. In the fertilized tests, corn and grain sorghum yields were increased 71 and 14 percent, respectively.

Brush Control

Macartney rose has become a serious pest on approximately 400,000 acres of pasture and rangeland in Southeast Texas. A native of China, the Macartney rose was introduced into Texas as a hedge plant before wire fences were developed. Domestic livestock, birds and wild animals eat the rose fruits and distribute the seed into areas not previously infested. Although the rose has some value as cover for wildlife, primarily it is classed as a pest because comparatively light stands greatly reduce the amount of forage available for used by livestock.

Numerous tests have been conducted at the Angleton Station in an effort to develop a definite eradication program. Mechanical treatments such as bulldozing or mowing have not proved effective since canes cut and spread over a pasture by machinery often take root and grow.

Seedlings and very young plants can be killed with a single application of 2,4-D, but older, undisturbed plants require several annual treatments. Sprout growth from mowed plants is extremely difficult to control except with an

intensive program of annual treatment with 2,4-D over a period of several years. In recent experiments, a single application of 2,3,6-TBA gave good control of undisturbed growth of all sizes, but was no more effective on mowed growth than 2,4-D.

Research is continuing with the screening of new chemicals to determine their effect on all types of growth, as well as seeking ways to make existing chemicals more effective.

STATE-WIDE RESEARCH

The Texas Agricultural Experiment Station is the public agricultural research agency of the State of Texas, and is one of the parts of the A&M College of Texas.

The Main Station and headquarters are located at College Station, with 20 substations and 9 field laboratories located throughout major agricultural areas of Texas. In addition, 15 cooperating stations are owned by other agencies, including the Texas Forest Service, the Game and Fish Commission of Texas, Texas Prison System, the U. S. Department of Agriculture, University of Texas, Texas Technological College and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

The Texas Agricultural Experiment Station is conducting about 350 active research projects, grouped in 25 programs which include all phases of agriculture in Texas.

Research results are carried to Texas farm and ranch owners and homemakers by specialists and county agents of the Texas Agricultural Extension Service.

ADMINISTRATION

R. D. Lewis
Director

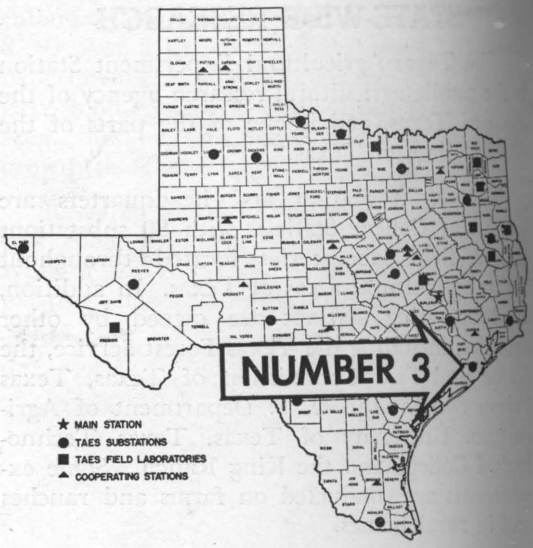
Roland J. Hildreth
Assistant Director

Victor E. Schember
Assistant Director

Alvin A. Price
Assistant Director

College Station, Texas

AGRICULTURAL RESEARCH seeks the WHATS, the WHYS, the WHENS, the WHERES and the HOWS of hundreds of problems which confront operators of farms and ranches, and the many industries depending on or serving agriculture. The workers of this substation, along with those of the Main Station and other field units of the Texas Agricultural Experiment Station, diligently seek to find solutions to these problems.



FOR BETTER LIVING

Today all people have a stake in agricultural research. The quality and quantity of food, feed and fiber available for their welfare are dependent on the information developed through organized research.

The Texas Agricultural Experiment Station concerns itself with problems confronting, and likely to confront, farmers and ranchmen, rural homemakers, farm groups and representatives of other organizations depending on or serving agriculture.

Continued agricultural research is necessary to point the way toward maintaining and improving our productive resources, improving quality, lowering costs of production, expanding markets, devising new and better methods for growing, processing and distributing farm and ranch products and toward better city and country living.

Researchers of the Texas Agricultural Experiment Station are dedicated to that aim. *Today's Research Is Tomorrow's Progress.*