The operating budget for the organization in 1963-64 was $217,200. This is three times the operating budget of 1951. The 1920 dues-income was about $7,000. In 1963-64 the cash flow for special projects was $200,000. This amount was in addition to the regular operating budget. The organization carries out many programs to accomplish its objective of improving higher education in engineering. Among these are regional and national meetings, teacher recognization, sponsoring special summer schools for teacher improvement, and externally supported studies of engineering education. Their special projects division carries out many of the activities. One such project is the visiting engineer program. This program allows a school to invite an outstanding engineer to visit their campus for lectures and consulation. The National Science Foundation pays most of the bills.

The organization sponsors National Science Foundation and National Space Agency scholarships. It cooperates with private foundations for various types of studies and fellowships.

In 1961 ASEE had nine full-time employees. This is just under one employee per one thousand members.

The Journal is the outstanding part of the organization for most members. Among article titles in recent issuues are:

"Engineering Education Circa"—2012 AD
"Women in Engineering"
"Some Aspects of Interdisciplinary Research"
"Transfers to the Schools and Colleges of Engineering"
"1951—53, 1959—61"
"What Can Be Done With College Surveying Courses?"
"Engineering Graphics at the Crossroads"
"Theodore Von Karman on Engineering Education"

It appears that this organization is far larger and richer than NACTA can hope to be, however, it was pointed out that the budget has tripled in the past ten years. This organization was established in 1893. NACTA was established only ten years ago. There is no reason to believe that NACTA cannot grow in the same way that ASEE has grown.

Members benefit from any organization in proportion to the amount of work the individual puts into it. As an organization grows, the benefits received per unit of work input usually go up. NACTA needs more members who are willing to work!

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Applied Plant Science

C. M. Greeg, Editor

A BRIGHTER FUTURE FOR THE PECAN IN TEXAS AND THE SOUTH

Samuel O. Stiles and C. M. Gregg*

The pecan tree is the State tree of Texas (10). Cabeza de Vaca found the pecan growing in Texas in 1528. The pecan is the most widely planted orchard tree in Texas, being grown commercially in 181 of the 254 Texas counties. The average value of the pecan crop over a period of ten or more years has been more than $8,000,000.00.

With these pertinent facts before us, we see cause to take a good look at the problems and possibilities of progress in this important enterprise in the great State of Texas.

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*Graduate student and professor of agriculture, respectively at Southwest Texas State College, San Marcos.

PECAN CULTURE

The Agricultural Research Service of the United States Department of Agriculture is conducting experiments on various problems concerned with pecan production at the pecan field stations. These include problems in orchard management, fertilization practices such as kinds of fertilizer, rates, and times of applications, and cover crops. Studies of disease control, including the testing of new materials and methods of application, are being carried out. According to Smith (7) one project of prime importance to the future of pecan growing is the crossbreeding and testing of new varieties to improve production, quality of nuts, and disease resistance.

During this "research hour" progress is being made in solving some of the problems concerned

with the production of pecan nuts. and there are many problems still to be solved. However, the results of pecan research, together with observations over a long period of time, indicate very clearly that one thing that is most needed to improve pecan production is more good farming practices in pecan orchards. Smith (7) reasons that too many other crops or enterprises are in competition with pecans for attention and too often the pecan is neglected in order to practice good farming with other crops. It is well to remember that pecan trees respond to good farming practices, and unless a tree is vigorous and strong it cannot produce large crops of nuts.

Progress In Pecan Breeding

Pecan breeding work being done at the United States Pecan Field Station at Brownwood, Texas indicates much progress has been made. Since the major production areas extend roughly from Texas to Georgia and up the central river valleys to southern Illinois, the work at the Brownwood station is planned to meet the needs of all pecan-growing areas as well as local needs. Romberg (6) reports that an attempt is made to produce varieties that are adapted to each of the various climatic areas and also meet various standards as to nut size, quality, and other desirable qualities.

In the humid climate of the southeastern states an essential characteristic of successful pecan varieties is reasonably good resistance to fungus diseases, particularly scab. Romberg (6) reasons that to get progeny that would have good resistance to scab, parent varieties that originated where humidity is high should be used. Two varieties, Stuart and Curtis have been crossed fruiting a considerable progney resulting in some selections good in nut characteristics. The Stuart was crossed with Barton, Brake, Brooks, Desirable Mahan. Moore, Odom, Schley and Success. Curtis has been crossed also with Barton, Candy, Success. T-35 (Success X Schley), T-55 (Success X Stuart). In addition, numerous crosses have been made between varities of southeastern origin other than Stuart or Curtis.

Evaluation of Varieties

Many variable factors enter into the evaluation of varieties and for this reason this subject will always be in controversy. The pioneers were particularly fascinated by a nut of large size. They apparently noticed thin shell and kernel quality much less than the seperation of the kernel from the shell. Romberg (5) cites the fact that in those days most of the kernels were removed by cutting the nut shell with a pocket knife as the nuts were eaten. in which case the cracking characteristic of the nut did not matter. Gradually conditions changed greatly. Large nuts are no longer a novelty, and pecan growers know that large nuts are more likely to be of poor quality and have shrunken kernels more than nuts of smaller size.

Numerous varieties have been compared in pecan shows or by other means so that growers now insist that to be really good a nut must have a good kernel. They also desire a high kernel content. Furthermore, about 90 per cent of all pecans are shelled by machinery; and for this purpose good cracking quality is desired, as well as a high kernel turnout states Romberg. (5)

Specialist conceded that no one variety will be universally adapted or desirable for all areas. However, breeding programs must adhere to the following characteristics to create adaptation desired: (1) disease resistance; (2) time of nut maturity; (3) quality of kernel; (4) suitability of nut to shelling; (5) adaptation of tree to particular climate or soil type; (6) bearing characteristics; (7) size, shape, and appearance of nut; (8) shell thickness. internal shell characteristics.

Release of New Texas Pecan Varieties

On February 26, 1953, the Bureau of Plant Industry, and Agricultural Engineering, United States Department of Agriculture released for propagation and general distribution a new pecan variety tested under the name T-15 and now ately heavy.

Origin: Moseman (3) reports that this new variety originated as a selection from controlled crosses between the Moore and Success varieties made by L. D. Romberg of the United States Pecan Field Station, Brownwood, Texas. The seedlings were grown in a nursery on the station grounds and in July, 1940, buds from them were set to a large bearing pecan tree. Branches were grown from the buds and a number of these, including T-15, now named Barton, fruited in 1944. In 1945, and thereafter, scion wood of this selection was distributed to growers. The test trees grown from this scion wood by top-working have proved to have such merit as to justify further named Barton.

Characteristics: The tree is vigorous in growth, less spreading in form than Success, and branches freely. It begins to bud and leaf out relatively late in the spring, at about the same time as Success. The leaves are intermediate in size. The trees come into production early. The shuck of the nut is exceptionally thin and opens well when the nuts have matured. No sprouting of nuts on the trees and no tendency towards "shuck disease" have been observed. The nuts mature at a time intermediate between the ripening periods of the parent varieties. Nut production is moderpropagation.

The nuts are of medium length with blunt ends and are well suited to cracking by machinery. The nuts are attractive and shell so satisfactorily that they meet with ready acceptance by consumers for the in-shell trade. The size is smaller than that of Success, but larger than Moore. The shell is unusually thin, even thinner than Schley. The kernel, consisting of about 58 per cent dry weight of the whole nut, releases well from the shell, is bright in color, smooth in form, of high oil content and rich flavor when matured. The kernel deteriorates more slowly with age than most varieties.

The value of the Barton variety is considered to rest in no single striking characteristic but in all-around good qualities states Moseman (3). The Barton is suited to areas where the Moore and Success varieties do well and from there westward. It is recommended for trial throughout the Southern pecan growing areas.

On December 21, 1955, the United States Department of Agriculture released for propagation and distribution a new pecan variety tested under the number 37-8-22 and now named Comanche.

Origin: The Commanche variety originated from crosses of the Burkett and Success by workers of the United States Pecan Field Station, Brownwood, Texas, in the orchard of the late John Barton, Sr., in the spring of 1937. The seedlings were grown in a nursery on the station grounds and in July, 1940, buds were set to a large bearing tree. Branches were grown from the buds and the 37-8-22 fruited in 1944. Thereafter scion wood of this selection was propagated for trial. Test trees grown from this scion wood by top-working proved to have merit as to justify further porpagation.

Characteristics: The tree is vigorous and less susceptible to scab and downy spot than the Burkett. The leaves are of medium size resembling the Success variety in this respect. The buds are not short and broad like those of Burkett, but comparatively long and pointed. The tree starts growth later than the Burkett and the nuts ripen at approximately the same time as those of Success. The shuck of the nut is of medium thickness and has a ridge at each of the four sutures, in this respect resembling Burkett. The tree is considered a moderate bearer.

The nuts are very similar to those of the Burkett variety, in shape and size, but the shell markings are more numerous on the Comanche. The Comanche has slightly heavier shell parts. Gullian (1) notes that the kernel characteristics of the Comanche is superior to the Burkett in that the Comanche kernel is normally brighter in color and free from dark flecks that occur on the Burkett, and can be kept longer without becoming rancid and dark. The Comanche is recommended for areas where Burkett does well, but not in the humid parts of the southern pecan growing areas.

The Crops Research Division, Agricultural Research Service, United States Department of Agriculture, March 12, 1959, released for propagation and distribution two new pecan varieties tested and developed by L. D. Romberg, at the United States Field Station, Brownwood, Texas.

Choctaw:

Origin: This new variety tested under number 46-15-276 originated as a controlled cross between the Success and Mahan varieties in the spring of 1946. Seedlings were grown in a nursery and in July, 1947, buds from them were set into a large bearing pecan tree and fruited in 1952. In 1954, and thereafter, scion wood of this selection was distributed to growers for trial purposes.

Characteristics: The tree is vigorous in growth, typical Eastern type, is less spreading in form than Success, and branches freely. It begins to bud and leaf out relatively late in the spring. The leaves are similar to those of Success, and appear resistant to disease and are held late in autumn. The shuck of the nuts is thin and opens well when the nuts have matured. The nuts mature at about the same time as those of Success. Propagated trees come into early production and bear heavy crops of nuts states Cullinan (2).

The nuts are about the same size as Success, about 45 nuts are required to weigh a pound. The shell is unusually thin. The kernel, consisting of 60 per cent or more of dry weight of the whole nut, releases well from the shell. The nuts are suited to cracking by machinery or by hand. In-shell nuts require careful handling to prevent shell breakage because of their thin and brittle shells.

The value of the Choctaw variety is considered for all-around good qualities. It is recommended for trial throughout southern pecan growing areas.

Wichita:

Origin: The Wichita variety tested under the number 40-9-193 originated as a controlled cross between the Halbert and Mahan varieties made in the spring of 1940. Seedlings were grown and in July, 1941, buds from them were set to a bearing tree and fruited in 1947. In 1949, scion wood of this selection was distributed to growers for trial purpose.

Characteristics: Cullinan (2) describes the Wichita as a strong grower, the foliage has excellent reistance to various factors which cause early defoliation and it has high efficiency in kernel formation. Growth starts at about the same time in the spring as on the Western and the nuts mature about the same time. The tree in an early and heavy bearer.

The nuts are of medium size, about 60 normal nuts being required to weigh a pound, and they contain 60 per cent or more of kernel. There is very little difference in the thickness of the shell and in the formation of the internal packing material and the central wall of the nuts of the Wichita and the Schley varieties.

The value of the Wichita rests chiefly in its good foliage, heavy consistant production of high quality nuts. The Wichita is recommended for trial where Western varieties do well.

On March 30, 1962, the Crops Research Division, Agricultural Research Service, United States Department of Agriculture released for propagation and distribution two new pecan varieties developed by L. D. Romberg, at the United States Pecan Field Station, Brownwood, Texas.

Apache:

Origin: The new Apache variety tested as T-110 originated as a selection from crosses between Burkett and Schley varieties made in 1940. It first fruited in 1945 and was propagated for trial in 1947.

Characteristics: The tree is vigorous with similar form and foliage shape of its parents. The nuts mature a little later than those of Burkett. The shucks of the nuts are as thick or slightly thicker than those of Burkett. Nut production is usually heavy and filling of the nuts is normally very good.

The nuts are blocky and a little longer than those of the Burkett parent. The shell color and markings resemble those of the Schley. The nut is as large as Burkett, but the shell is thin and the kernel content averages about 60 per cent. Parker (4) concludes that the Apache merits introduction because it combines good production, good tree vigor with desirable nut size, shape and cracking quality and high percentage kernels which do not deteriorate rapidly in storage.

The Apache is recommended for the sandy uplands of Texas and the western pecan areas where it has performed well under tests. It has not been amply tested for scab resistance and since its Burkett parent is scab susceptible, it should not be widely planted in the humid areas of the southeast until its scab resistance and production performance is better known.

Sioux:

Origin: The new Sioux variety tested as 43-4-6 originated from crosses between Schley and Carmichael varieties made in the orchard of H. G. Lucas, Brownwood, Texas, in 1943. It first fruited in 1948 and was propagated for trial in 1949.

Characteristics: The tree is vigorous with similar form and foliage shape of its parents. Strong growing shoots have a pronounced tendency to form lateral branches. Production is usually heavy and the nuts mature at mid-season for pecans.

Parker (4) points out that the nuts are about one-fifth smaller than those of Schley, however, the thin shelled Sioux develops nuts that average 60 to 61 per cent kernel. The kernel has excellent appearance and quality, bright in color, and excellent flavor and does not deteriorate rapidly in storage.

Sioux was introduced because of its exceedingly high kernel quality and its ease of cracking by commercial machinery. It combines good tree vigor and good productions. Sioux is recommended for trial in central Texas and westward, but should not be extensively planted in humid areas of the southeast until its scab resistance and production is better known.

Conclusion

The increasing population of the nation presents a challenge to pecan growers. The sales of pecans to the customer will be in proportion to the desires of the public, to their needs. Therefore, much attention is focused on not only good orchard management, but on the crossbreeding and testing of new varities to improve production, quality of nuts, and disease resistance. To such a time consuming and rewarding task have the various state agricultural experiment stations in the south vigorously dedicated much time, effort and research.

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Applied Animal Science

Dr. Gordon Stewart, Editor

THE MISSOURI BEEF CATTLE IMPROVEMENT PROGRAM

Dr. John W. Massey, Assistant Professor and Extension Livestock Specialist
University of Missouri

The Missouri beef cattle improvement programs are available to beef cattle breeders who may use them to check each animal's performance from birth until it is added to a herd or slaughtered. These programs have flexibility and will be