No. 7200047

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

The Texas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF seventeen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW,* [THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM,] TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS ALLOWED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

*(Waived)

COTTON

'Tamcot SP21'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* eighth *day of* August *in the year of our Lord one thousand nine hundred and* seventy-five

Attest:

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Secretary of Agriculture

FORM GR-470
(2-12-71)

UNITED STATES DEPARTMENT OF AGRICULTURE
CONSUMER AND MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION Tamcot SP21	2. KIND NAME Cotton	FOR OFFICIAL USE ONLY PVPO NUMBER 72047
3. GENUS AND SPECIES NAME Gossypium hirsutum L.	4. FAMILY NAME *(Botanical)* Malvaceae 5. DATE OF DETERMINATION September 1968	FILING DATE 10/26/71 TIME 12:20 A.M. P.M. FEE RECEIVED $750 CHARGES
6. NAME OF APPLICANT(S) Texas Agricultural Experiment Station	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)* Texas A&M University College Station, Texas 77843	8. TELEPHONE AREA CODE AND NUMBER 713 845-3711 713 845-4051
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)* Land Grant University	10. STATE OF INCORPORATION Texas	11. DATE OF INCORPORATION 1876

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers:

Dr. J. W. Collier
Executive Secretary
Plant Variety Protection
Policy Committee

MAILING ADDRESS:
Foundation Seed Section
Department of Soil & Crop Sciences
Texas Agricultural Experiment Station
College Station, Texas 77843

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

[X] 12A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52, P.L. 91-577)*

[X] 12B. Exhibit B, Botanical Description of the Variety

[X] 12C. Exhibit C, Objective Description of the Variety

[X] 12D. Exhibit D, Data Indicative of Novelty

[X] 12E. Exhibit E, Statement of the Basis of Applicant's Ownership

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable. *(See Section 52, P.L. 91-577).*

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? *(See Section 83(a), P.L. 91-577) (If "Yes," answer 14B and 14C below.)* [X] YES [ ] NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations? [X] YES [ ] NO

14C. If "Yes," to 14B, how many generations of production beyond breeder seed? Three generations foundation, registered, & certified

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act (P.L. 91-577).

(DATE) H. O. Kunkel, Dean and Acting Director
(SIGNATURE OF APPLICANT)

(DATE) H. O. Kunkel
(SIGNATURE OF APPLICANT)

FORM GR-470 (REVERSE)

6/11

U.S. DEPARTMENT
RECEIVED
OCT 26 1971
CAMS GRAIN DIVISION

INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and $50.00 fee to U.S. Dept. of Agriculture, Consumer and Marketing Service, Grain Division, Hyattsville, Maryland 20782. Retain one copy for your files. All items on the face of the form are self-explanatory unles noted below.

ITEM

5 Insert the date the applicant determined that he had a new variety.

12a First, give the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method. Second, give the details of subsequent stages of selection and multiplication. Third, indicate the type and frequency of variants during reproduction and multiplication and state how these variants may be identified. Fourth, provide evidence on stability.

12b First, give any special characteristics of the seed and of the plant as it passes through the seedling stage, flowering stage and the fruiting stage. Second, describe the mature plant and compare it with a similar commercial variety grown under the same conditions, and indicate the differences.

12c A supplemental form will be furnished by the PVPO to describe in detail a variety for each kind of seed.

12d Provide complete data indicative of novelty. Seed and plant specimens may be submitted and seeds submitted may be sterile. Where possible, include photographs of plant comparisons, chemical tests, etc.

12e Indicate whether applicant is the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.

Exhibit 12A, Tamcot SP21

The following parents were used in crosses.

1. K4808-5(1&2)A

2. K4808-5(1&2)D

Parents 1 and 2 were developed in the following manner. In 1950 Dr. R. L. Knight's *Gossypium barbadense* Sakel strain BAR 4/16 carrying the B_2B_3 genes for bacterial blight resistance was crossed with E808 (an Empire WR breeding strain obtained from Mr. Barney Hawkins). Four backcrosses were made to E808 and the B_2B_3 genes were transferred. One breeding strain from this transfer was designated K4808-5(1&2). It was segregating for glabrousness and for pollen color. K4808-5(1&2) was sent to Alabama for evaluation in the 1956 Tallassee Fusarium wilt-nematode nursery. Dr. A. L. Smith reported a good level of resistance to wilt-nematodes and made five plant selections designated A,B,C,D and E. These were planted in the greenhouse in 1956-57, inoculated and selected for bacterial blight resistance. The plants from selections A and D were used in crosses.

3. CA291A: This was the strain designation for Blightmaster which was developed by Dr. Levon Ray and Mr. Don Jones of the Research and Extension Center at Lubbock. Blightmaster carries the B_7 gene for blight resistance.

4. 39-11-20: This was a glandless strain with the gl_1 gl_2 genes that came originally from Mr. Scott McMichael.

5. Pay M54-M-105-3: This was a Paymaster strain obtained in 1956 for Mr. Quentin Adams, ACCO Seed Farm, Aiken, Texas.

6. MA56005: This was the Chillicothe Station designation for the F_1 seed of the cross [CA291A x 39-11-20] which was made by Mr. Roy Quinby in 1956.

7. 62K,BV61: The designation of material developed from the cross [K4808-5(1&2)D x MA56005] which was made in the greenhouse in 1956-57. It carried the $B_2B_3B_7$ genes for blight resistance.

8. 92K,BV63: The designation of material developed from the cross [K4808-5(1&2)A x Pay M54-105-3] which was made in the greenhouse in 1956-57. It carried the B_2B_3 genes for blight resistance.

During the winter of 1963-64 the F_{11} of the 62K,BV61 material was grown. Following the K4808-5(1&2)D x [CA291A x 39-11-20] cross, straight selection was practiced. In the process, selection was made five times for blight resistance and twice for seedling disease escape. At the same time, the F_8 of the 92K,BV63 material was grown. Following the K4808-5(1&2)A x Pay M54-M-105-3 cross, straight selection was made six times for blight resistance and once each for Fusarium wilt-nematode resistance and seedling disease escape.

Using greenhouse plants, the cross 62K(428A) x 92K(451A) was made. Following two selections for blight resistance and one for seedling disease escape the F_3 progeny was 17M,BV65. This progeny was given the strain designation SP21-65,237,T. This was the basic breeding stock from which strains of the SP21 family were selected.

Using the 1963-64 greenhouse grown plants, the cross 92K(448B) x 62K (427B) was made. Following two selections for blight resistance and one for seedling disease escape, the F_3 progeny was 66N, BV65. This progeny was given the strain designation SP23-65,237,T. This was the basic breeding stock from which strains of the SP23 family were selected.

Exhibit 12A, Tamcot SP21

From the same 448B x 427B cross, followed by four selections for blight resistance, one for wilt-nematode resistance and two for seedling disease escape, the F_5 progeny was 49R,BV66. This progeny was given the strain designation SP37-66,237,T. This was the basic breeding stock from which strains of the SP37 family were selected.

The breeding procedure is considered to be delayed convergent improvement followed by straight selection to obtain progressive improvement within a family. The improved strains of a family that are similar are then bulked to form a synthetic variety that represents the family. The adversity-multiple-disease resistance and escape procedures (selecting for seed and seedling cold tolerance, resistance to seed deterioration, earliness and environmental neutrality) are used in strain improvement. The improved strains are bulked for breeder's seed of the variety.

Frequency of variants will be given in exhibit B for the special characteristics of the variety.

The varieties have been quite stable over a three year test period. See the attached Table 12A-1 for evidence of stability in yielding ability.

Table 12A-1. Average yield of cotton varieties and strains for the years 1968-70 illustrating the potential of the Tamcot SP strains for improving the cotton industry in Texas.

Variety types and strains	Average yield of fiber per acre	Percentage of yield measurements above the Texas average
	lbs.	%
Lankart, n=42	436±28	74
Stoneville, n=42	482±39	64
Deltapine, n=42	461±37	62
Lockett, n=42	401±26	67
Paymaster, n=42	418±29	64
Tamcot SP21, n=64	554±37	75
Tamcot SP23, n=61	562±37	75
Tamcot SP37, n=58	590±43	76
1968-70 Texas average	340	-

Exhibit 12A, Tamcot SP21

Summary Pedigrees for the SP Families

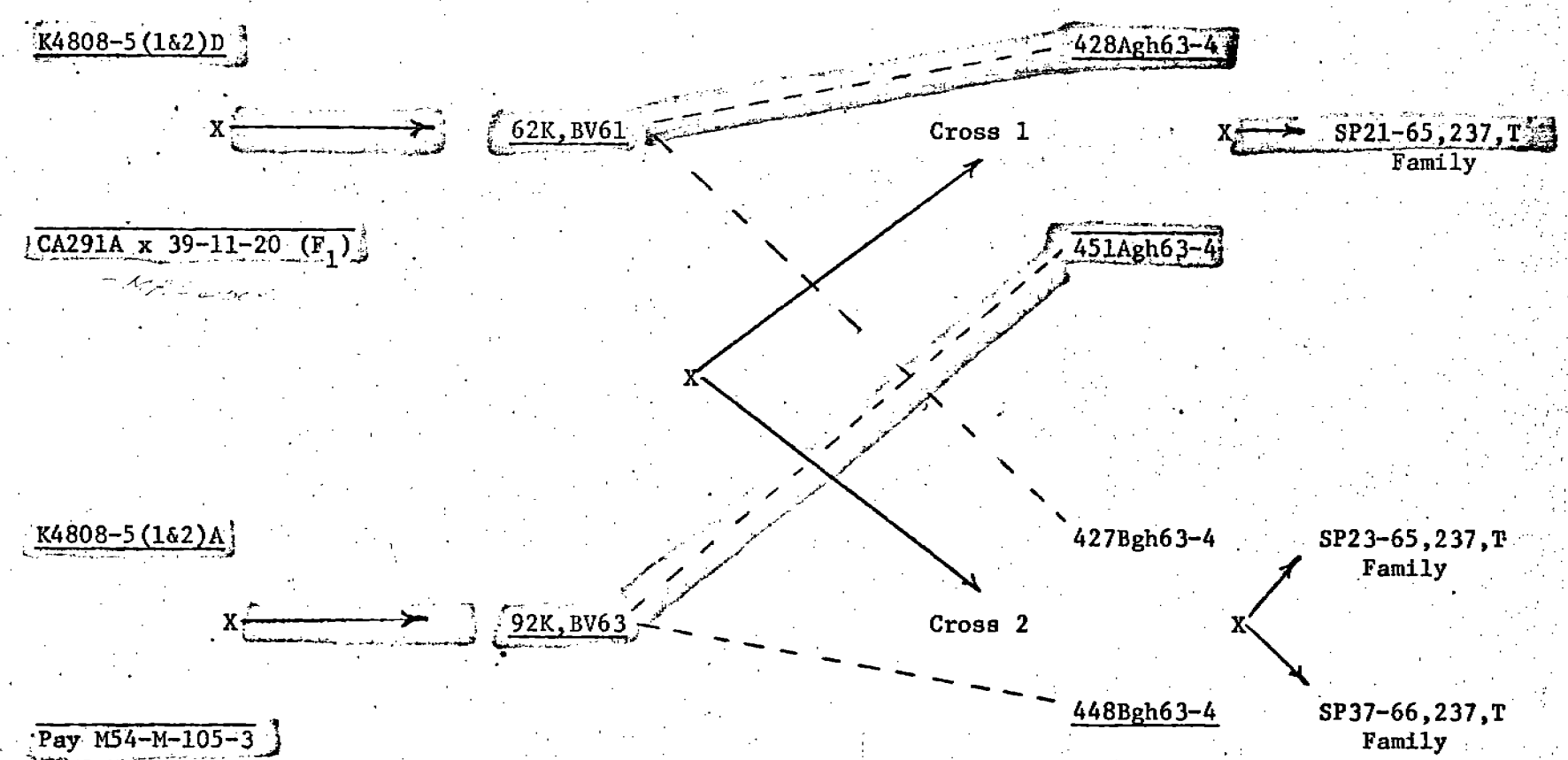

Exhibit 12B, Tamcot SP21

Tamcot SP21 has no unusual botanical seed or seedling characteristics. The flower is medium in size and the corolla and pollen are cream colored which is the case for most commercial varieties. The leaves are medium in size and are smooth (glabrous). The main stem is strong, smooth and turns red with maturity as compared with Lankart 57 and Stoneville 7A which are hairy and the stem remains green. A variant of Tamcot SP21 is about 8% hairy plants. Type of growth is determinant to intermediate with occasional vegetative branching. The bolls (fruit) are small, oval in shape and storm resistant as compared with Lankart 57 which has large, round and storm resistant bolls and Stoneville 7A which has small, oval and open bolls (seed cotton loose in the bur). The mature defoliated plant stands erect, fruiting branches are prominent and the seed cotton is compact in the bur. Stems and branches have a prominent dark red color.

1

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-8
(10-2-72)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Cotton)

OBJECTIVE DESCRIPTION OF VARIETY
COTTON (*GOSSYPIUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Texas Agricultural Experiment Station

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
System Building
College Station, Texas 77843

FOR OFFICIAL USE ONLY

PVPO NUMBER
72047

VARIETY NAME OR TEMPORARY DESIGNATION
Tamcot SP21

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. SPECIES:

[1] 1 = GOSSYPIUM HIRSUTUM 2 = GOSSYPIUM BARBADENSE

2. AREA(S) OF ADAPTION (0 = Not Tested, 1 = Not Adopted, 2 = Adopted):

[0] EASTERN [0] DELTA [2] CENTRAL [2] HIGH PLAINS [2] EL PASO AREA

[0] WESTERN LOW HOT VALLEYS [0] SAN JOAQUIN [ ] OTHER (*Specify*) _____

3. MATURITY (50% Open Boll):

[1][5] NO. OF DAYS *EARLIER* THAN ..... [3]

[0][0] NO. OF DAYS *LATER* THAN ..... [8]

1 = COKER 310 2 = DELTAPINE 16 3 = STONEVILLE 213
4 = PAYMASTER 111 5 = ACALA 1517-70 6 = ACALA SJ-1
7 = LANKART 57 8 = OTHER (*Specify*) Earlier than all 7 given

4. PLANT HABIT:

[2] 1 = SPREADING 2 = INTERMEDIATE 3 = COMPACT

[3] 1 = FOLIAGE SPARSE 2 = DENSE 3 = OTHER (*Specify*) Intermediate

5. PLANT HEIGHT:

[2][2] CM. *SHORTER* THAN ..... [2]

[0][4] CM. *TALLER* THAN ..... [8]

1 = COKER 310 2 = DELTAPINE 16 3 = STONEVILLE 213
4 = PAYMASTER 111 5 = ACALA 1517-70 6 = ACALA SJ-1
7 = LANKART 57 8 = OTHER (*Specify*) Lankart 611

6. MAIN STEM:

[2] 1 = LAX 2 = ASCENDING 3 = ERECT

[16] CM. TO FIRST FRUITING BRANCH

[0][6] NO. OF NODES TO FIRST FRUITING BRANC (*from cotyledonary node*)

7. LEAF:

[1][9] CM. WIDTH OF WIDEST LEAVES AT MATURITY

8. LEAF PUBESCENSE:

[5] 1 = GLABROUS (HAIRS AS SPARSE AS D_2 SMOOTH) 2 = SMOOTH LEAF (DELTAPINE SMOOTH LEAF) 3 = PUBESCENT (STONEVILLE 213) 4 = HEAVY PUBESCENCE (H_1 OR H_2) 5 = OTHER (*Specify*) glabrous h_1 h_2

9. LEAF COLOR:

[3] 1 = VIRESCENT YELLOW 2 = LIGHT GREEN 3 = DARK GREEN (*Acala-442*) 4 = RED 5 = OTHER (*Specify*) _____

10. LEAF TYPE:

[1] 1 = NORMAL 2 = OKRA 3 = SUPER OKRA 4 = OTHER (*Specify*) _____

11. FLOWER:

[2] 1 = NECTARILESS 2 = NECTARIED

[1] Petals: 1 = CREAM 2 = YELLOW

[1] Pollen: 1 = CREAM 2 = YELLOW

12. FRUITING BRANCH TYPE:

[3] 1 = CLUSTER 2 = SHORT 3 = NORMAL

[2] 1 = DETERMINATE 2 = INDETERMINATE

13. GOSSYPOL CONDITION:

[3] 1 = GLANDLESS 2 = REDUCED GLANDS 3 = NORMAL GLANDS 4 = OTHER (*Specify*) _____

[1] 1 = NORMAL BUD GOSSYPOL 2 = HIGH BUD GOSSYPOL

14. SEEDS:

[1][0][8] ± [2][0] SEED INDEX (*Fuzzy seed basis*)

[2] Seed Fuzz: 1 = SPARSE (GREGG 35) 2 = MODERATE (DPL-16) 3 = HEAVY (ACALA SJ-1) 4 = OTHER (*Specify*) _____

8

Attachment 1

Exhibit C, PVPO Number 72047 Variety Tamcot SP21

20. Diseases

(0=Not tested, 1=Susceptible, 2=Intermediate Resistance, 3=Resistant, 4=Tolerance, 5=Delay-Kill Resistance, 6=Escape, 7=Other, specify posesses)

[3] Verticillium wilt

[3] Bacterial blight, give genes if known: $B_2B_3B_7$

Give races for which resistance is known: 1,2,6,7,10,12 & 14

[0] Anthracnose

[3] Fusarium wilt

[1] Ascochyta blight

[1] Rust

[2] Root knot nematode

[1] Reniform nematode

[1] Phymatotrichum root rot

[2] Seedling disease

[0] Specific seedling pathogens

Give pathogen: _____

[1] Seed deterioration

[7] Seed and seedling cold tolerance

[ ] Other (Specify) _____

Cr 7200047 TAMCOT SP21

FORM GR-470-8 (REVERSE)

15. BOLLS:

[2] Locules: 1 = 3-4, 2 = 4-5

[3 3] NO. SEEDS PER BOLL

[3 7 3] LINT PERCENT

[3 8] MM. DIAMETER

[3] Pitted: 1 = NONE, 2 = FINELY, 3 = COURSELY

[5 8 4] GRAMS SEED COTTON PER BOLL

[2] Breadth: 1 = BROADER AT BASE, 2 = BROADER AT MIDDLE

[2] Type: 1 = STORMPROOF (WESTBURN 70), 2 = STORM RESISTANT (LANKART 57), 3 = OPEN (DELTAPINE 16)

[3] Shape: 1 = LENGTH < WIDTH, 2 = LENGTH = WIDTH, 3 = LENGTH > WIDTH

16. BRACTEOLES:

[3] Breadth: 1 = LENGTH < WIDTH 2 = LENGTH = WIDTH 3 = LENGTH > WIDTH

[1] Teeth: 1 = FINE 2 = COURSE

[4] Teeth: 1 = 3-4 2 = 5-7 3 = 8-10 4 = OTHER (*Specify*) 10-12

17. YIELD: Compared to–

[0 8 1] PERCENT *LESS* THAN ..... [2]

[0 6 5] PERCENT *MORE* THAN ..... [7]

1 = COKER 310 2 = DELTAPINE 16 3 = STONEVILLE 213
4 = PAYMASTER 111 5 = ACALA 1517-70
6 = ACALA SJ-1 7 = LANKART 57

18. FIBER LENGTH (Complete one or more of the following and give the means):

[0 5 0] SPAN LENGTH 50%

[1 0 5] SPAN LENGTH 2.5%

[- - -] U.H.M. LENGTH

[- - -] MEAN LENGTH

[3 3] STAPLE LENGTH 32nd INCHES

[- -] UNIFORMITY RATIO (MEAN/U.H.M.)

[4 8] UNIFORMITY INDEX (50% SPAN/2.5% SPAN)

19. FIBER STRENGTH AND ELONGATION:

[0 9 0] 1,000 P.S.I.

[0 6 5] ELONGATION E_1

[- - -] STILOMETER T_0

[4 0 0] MICRONAIRE READING

[1 1 7] YARN STRENGTH (*Give test method*) 27 Tex. Std. Sk.

[1 9 0] STILOMETER T_1

20. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant) See attachment 1

[ ] VERTICILLIUM WILT

[ ] FUSARIUM WILT

[ ] ROOT KNOT NEMATODE

[ ] BACTERIAL BLIGHT (*Race 1*)

[ ] BACTERIAL BLIGHT (*Race 2*)

[ ] ASCOCHYTA BLIGHT

[ ] PHYMATOTRICHUM ROOT ROT

[ ] RHIZOCTONIA

[ ] ANTHRACNOSE

[ ] RUST

[ ] OTHER (*Specify*)

21. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] BOLL WEEVIL

[0] APHID

[0] FLEAHOPPER

[0] LEAFWORM

[0] FALL ARMYWORM

[0] GRASSHOPPER

[0] LYGUS

[0] PINK BOLLWORM

[0] STINKBUG

[0] THRIP

[0] CUTWORM

[0] SPIDERMITE

[0] OTHER (*Specify*)

REFERENCES: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(1) Brown, Harry B., and J. O. Ware, 1958, Cotton, McGraw-Hill Book Company, Inc., New York.

(2) Lewis, C. F., and H. H. Ramey, Jr., 1971, 1970 Regional Cotton Variety Tests, ARS 34-130, United States Department of Agriculture.

COLORS: Nickerson's or any recognized color fan may be used to determine flower color of the described variety.

Exhibit 12C, Tamcot SP21

Tamcot SP21, is the first of three initial varieties developed in the multi-disease resistance and escape program of the Texas Agricultural Experiment Station. It has high resistance to bacterial blight, resistance to the Fusarium wilt-root knot nematode complex, tolerance to Verticillium wilt, slight cold tolerance for seed germination, slight escape from seedling disease, escape from Phymatotrichum root rot via earliness and escape from other adversities in production. It has a good average yielding ability (Table D1) combined with the above traits along with having smooth (glabrous) leaves and stems, a storm resistant boll, earliness and fiber length and strength equal to those of the Delta varieties with the advantage of having a lower micronaire value (Table D2). Tamcot SP21 should be of real value to the cotton growers of the Trans-Pecos and South High Plains irrigated areas, who desire to produce a Delta type fiber, or where smooth leaves and stems may aid in insect control and to reduce trash in cotton. It should be efficient in narrow-row plantings.

Tamcot SP21 is probably more similar to Deltapine 16 than other Upland varieties. Tamcot SP21 is distinctly different from Deltapine 16 and other varieties in being totally glabrous. The stems and branches of Tamcot SP21 are red in color whereas for Deltapine 16 they are green. Tamcot SP21 has a level of resistance to the wilts similar to that of Deltapine 16. Tamcot SP21 is highly resistant to seven races of Xanthomonas malvacearum whereas Deltapine 16 is susceptible to all known races. Tamcot SP21 is much earlier in maturity than Deltapine 16. Tamcot SP21 and Deltapine 16 have similar types of plant branching and leafiness but the plant of Tamcot SP21 will always be shorter. The boll of Tamcot SP21 is storm resistant and the boll of Deltapine 16 is open.

Averages show relative comparisons for fiber measurements.

	Length	Strength	Micronaire
Tamcot SP21	1.05	91	4.4
Deltapine 16	1.09	88	5.0

Except for micronaire the fiber measurements are similar and in many cases the micronaire measurements will be lower.

Tamcot SP21 differs from Tamcot SP37 in glabrousness vs. pubescense, red stems vs. green stems, wilt resistance vs. wilt susceptibility, cream pollen vs. yellow pollen and high fiber strength and micronaire.

Tamcot SP21 differs from Tamcot SP23 in glabrousness vs. pubescense, red stems vs. green stems, higher resistance to the wilts and a longer fiber. The boll of Tamcot SP21 is more storm resistant than the boll of Tamcot SP23.

Tamcots SP21, SP37 and SP23 have the same degree of high resistance to seven races of the bacterial blight pathogen. No other United States variety approaches this high level of uniform resistance.

Comparisons Between Tamcots SP21, SP23 and SP37 and Varieties

Refer to Table D2 in which comparative data are given. The various characters will be discussed separately.

Bacterial blight: The three SP strains have basically the same level of resistance (grade 1= immunity while grade 10= full susceptibility). Resistance is due to the $B_2B_3B_7$ major genes along with favorable minor genes. The SP strains have demonstrated the ability to reduce economic loss in both mild and severe natural epidemics of the disease.

Seed: Because of earliness, seed of the SP strains had more field exposure after boll opening than those of the varieties. Free fatty acids; SP37 has an advantage over SP21 and SP23 and the varieties, SP23 probably has a slight advantage over the varieties while SP21 does not. Protein; the three SP strains have an advantage over Lankart 57 and only SP21 and SP37 may have a slight advantage over Stoneville 7A.

Survival of seedlings: SP37 is better than SP21, SP23 and the varieties at the lower temperature. SP23 probably has a slight advantage over SP21 and the varieties. SP21 is probably better than Lankart 57. The SP strains have no advantage at the higher temperatures.

Fusarium wilt-root knot nematodes: SP21 and SP23 have resistance to this disease complex while SP37 does not.

Verticillium wilt: SP21 and SP23 have tolerance to this disease while SP37 may have slight tolerance.

Phymatotrichum root rot: SP21 and SP37 have some degree of escape for reducing economic loss from this disease. It is believed that the main cause is earliness. However, there is a suggestion that SP37 may have a degree of the delay-in-kill characteristic.

Yield: SP37 almost consistently yields more than SP21 and SP23 (Table D2). In the absence of adversities, the SP strains yield as well as the best varieties. When adversities are present the SP strains yield 150 to 179 pounds more lint per acre than the best varieties. Across all situations the SP strains average about 42 to 83 pounds more lint per acre than the best varieties. Under the assumption that the data collected to date are representative for Texas, the SP strains could improve the average yield of 42% of the planted acreage by about 165 pounds lint per acre or about 62 pounds per acre on the total acreage. This would increase the expected total production in 1971 by about 661,000 bales. Yield differences given in Table D3, obtained from a greater number of comparisons, indicate that SP23 has the greatest potential for reducing disease losses while SP37 has the best potential for reducing losses from adversities other than disease. These differences indicate that the SP strains have the potential of increasing average acre yields in Texas by 214 to 276 pounds per acre or by 63 to 81 percent.

Insects: The SP strains have demonstrated the ability to have higher yields than varieties where the only known adversity was insect problems. The present assumption is that this advantage is caused by the earliness of the SP strains. However, it should be pointed out that recent work in Africa has

associated the B_2B_3 genes for bacterial blight resistance with less damage from an insect and with resistance to boll rotting fungi.

Fiber: In terms of length, strength, micronaire and yarn strength each SP strain has a different fiber. In terms of end uses, SP21 and SP37 have the same fiber which is definitely different from that of SP23. The SP strains have an advantage over many present day varieties in having lower micronaire values combined with strength. This type of fiber gives yarn that performs better on present day high rpm machinery. Simultaneous release of the three strains, each having different fiber, will make it possible for more producers to benefit from yield increases of the SP genetic material while still giving consideration to the fiber markets they serve.

Lint percent: The SP strains have no advantages or disadvantages.

Earliness: The SP strains are as early or earlier than most of the present day varieties. The data do not indicate it, but in most field cases SP21 is earlier than SP23 and SP37. Earliness is a key trait that is a must for varieties of the future.

Storm resistance: Bolls of the SP strains have a level of storm resistance that permits either machine picking or stripping as a means of harvest. SP21 has the lowest level of storm resistance thus it may be more useful where machine pickers are largely used.

Seed index: The SP strains tend to have a seed index that is intermediate. SP37 has an index that is lower than those for SP21 and SP23.

Exhibit 12E, Tamcot SP21

Tamcot SP21 was developed in the adversity-multiple-disease resistance and escape program of the Texas Agricultural Experiment Station. The original crosses, subsequent crosses and selection cycles were made by Texas Agricultural Experiment Station personnel. L. S. Bird, Professor of Plant Sciences, The Texas Agricultural Experiment Station, directed the genetic improvement program during the entire period. The principle Research Assistants, Professional Associates and Technicians who assisted Dr. Bird, the breeder, were or are employee's of the Texas Agricultural Experiment Station. Some disease resistance performance data were obtained in regional nurseries. Fiber evaluation data were provided by the A.R.S., U. S. Department of Agriculture, Knoxville, Tennessee Laboratory and the Textile Research Center, Texas Tech University, Lubbock, Texas. The principle source of funds in addition to those of the Station were from grants by the Cooperative State Research Service of the U.S. Department of Agriculture. The Texas Agricultural Experiment Station by virtue of employing the principle personnel and providing facilities, direct and indirect cost for the adversity-multiple-disease resistance and escape program is the owner of Tamcot SP21.