APPLICATION FOR APPROVAL OF __X__CULTIVARS____ASSOCIATE CULTIVARS
(Please check appropriate type of application)

1. Crop: Tall Fescue (*Festuca arundinacea* Schreb.)

2. Experimental no. or name: GA-Jesup Improved, GA-Jesup Improved-EI, GA-Jesup Improved-EF

3. Pedigree and history: GA-Jesup Improved tall fescue is a 15 clone synthetic cultivar. The 15 endophyte-infected parents originated from 32 clones collected in 1981 from a pasture near Jesup, GA that had been established with 'Kentucky 31' tall fescue in 1967. The 32 clones were polycrossed in 1982 at Athens, GA and their polycross progeny tested during 1983-85 at Tifton and Athens, GA. The 15 clones whose polycross progeny possessed the best survival and yield were then polycrossed in isolation during 1986 and equal quantites of seed from each clone bulked to produce syn 1 seed. This syn 1 seed was used to produce syn 2 seed during 1987. A portion of this syn 2 seed was then heat treated to remove its endemic endophytic fungus. The two versions of GA-Jesup Improved, endophyte infected (EI) and endophyte free (EF), were planted in isolation during 1988 with the planting of each version still producing syn 3 breeders seed. The syn 4 generation is defined as foundation seed and will be used to produce certified seed (syn 5) of each version.

4. Description: GA-Jesup Improved tall fescue can be found in two versions, EI (causal fungi is *Acremonium coenophialum* Morgan-Jones and Gams with >95% of the germinating seedlings showing endophyte infection as determined with an accepted seedling grow-out test) or EF (<5% of the seedlings infected as determined with a grow-out test). It is adapted to the southern coastal plain region of the southeastern US (Gulf Coast area from Louisiana through southern Georgia and Florida) and low maintenance, stress areas of the transition zone (northern Mississippi through northern Georgia including Tennessee). GA-Jesup Improved-EI is the more persistent than 'Georgia 5' and 'Kentucky 31' and is intended for use as forage and general purpose turf in its adaptation area. GA-Jesup Improved-EF will provide high quality fattening pasture for livestock in the main fescue growing region of the upper south. GA-Jesup Improved is green leaved and possesses medium to early maturity with an average heading date more equal to Georgia 5 and Kentucky 31, but earlier than 'Rebel' and later than 'AU Triumph' at Athens, GA (Table 1). Its plant height and seedhead and flag leaf length are shorter than Georgia 5, but its plant height is more like Kentucky 31 and taller than Rebel (Table 1).

5. Station(s) where developed: College Station, Athens, GA

6. Participating scientist(s): Joe H. Bouton (breeder) and Ronny R. Duncan. The breeder gratefully acknowledges the technical help of Donald Wood and Frank Newsome and the collaboration of Vaughn Calvert, Roger Gates, Carl Hoveland, and Mark McCann in conducting various agronomic and animal grazing trials.

Copy of the appropriate and adequate data comparing proposed release to standard cultivar must be attached to this form.

7. In what respect is the new cultivar superior to the cultivar now in use? or reasons for proposing release as an associate cultivar. **Forage Claims:** Georgia 5, an endophyte-infected cultivar (E+) with superior ability to withstand the heat, drought, and pest stresses inherent in the southern coastal plain region, is the only tall fescue cultivar currently recommended for use in that region. Kentucky 31 (E+), where assayed for endophyte infection, has some limited use. When tested at three locations in the coastal plain region (Winnsboro, LA, Tifton, GA, and Ona, FL), GA-Jesup Improved-EI consistently demonstrated better long term plant stand survival than E+ Georgia 5 and Kentucky 31 (Tables 2-4). This better survival ability is responsible for its superior second and third year (especially fall) dry matter yield (Tables 3-5). Beef steer gains on GA-Jesup Improved-EI when averaged for 3 yr ranged from 0.6 to 0.9 lbs/day depending on the grazing pressure (Table 6). Although the average daily gains recorded for GA-Jesup Improved-EI are typical for steers consuming endophyte-infected tall fescue, steer gains for GA-Jesup Improved-EF were much higher and not different from alfalfa (Table 6). When tested against other high quality proprietary endophyte-free (E-) and orchardgrass (*Dactylis glomerata* L.) cultivars for three years at three locations in northern Georgia, GA-Jesup Improved-EF showed dry matter yields better than 'Shiloh' orchardgrass, similar to Kentucky 31 (E-) and 'MSF 77-1' (a new E- release from Mississippi State), but less than AU Triumph (Table 7). However, it has shown a better ability than AU Triumph to retain stands after harsh summer haying and grazing conditions (Tables 4 and 8). **Turf Claims:** The persistence of GA-Jesup Improved-EI under hay clipping conditions (Tables 2-4) also allows it to be used as a persistent, general purpose turfgrass for the coastal plain region or heat-stressed environments in the main tall fescue growing region of the upper south. When planted in low-maintenance turf conditions in Athens, it showed more persistence and a superior ability to retain stands and prevent open bare areas than either Kentucky 31 or Rebel (Table 9). When grown under high management turf conditions at two US locations (Georgia and New Jersey), GA-Jesup Improved-EI possessed turf quality scores similar to Kentucky 31 and Georgia 5, but less than proprietary turf-type cultivars such as 'Rebel Jr.' and 'Falcon' (Tables 10 and 11).

8. Method of propagation: Seed

9. Amount of breeder seed stocks available (if applicable): A 1.0 acre field and a 0.2 acre field will produce syn 3 breeders seed of GA-Jesup Improved-EI and GA-Jesup Improved-EF, respectively., These breeder blocks are maintained at the Plant Sciences Farm near Athens, GA. Since endophyte-infected seed has a short storage life, breeders seed will be produced on a yearly basis. This results every year in production of approximately 400 pounds of clean breeders seed from the GA-Jesup Improved-EI field. Although the breeder block of GA-Jesup Improved-EF will also continuously produce seed, we currently have in storage nearly 100 lbs for future use.

10. Amount of foundation seed stocks available (if applicable): Currently 5 acres of GA-Jesup Improved-EI in production in both Oregon and in Georgia. Two thousand pounds of foundation seed of GA-Jesup Improved-EI is in storage in Plains, GA.

11. Amount of cutting or bud material available for vegetatively propagated material for

11. Amount of cutting or bud material available for vegetatively propagated material for nursery distribution (if applicable): Not applicable

12. Is there likely to be unusual difficulty encountered in the production of any class of seed stocks? Explain. The endophyte-infection level of any foundation or certified seed field for GA-Jesup Improved-EI must be >90%. The same level of infection should also be guaranteed with a recent (less than 6 months), grow-out test before sale of certified seed.

13. Three suggested names for the cultivar: None suggested at this time. Since there are two versions, it is anticipated a commercial company will sell each version under the same brand name.

14. Name approved by the plant cultivar and germplasm release committee: Jesup (JHB)

15. Form of intellectual property protection: Plant Variety Protection

16. Is a royalty assessment recommended: X Yes ____ No

RECOMMENDED BY:

A. Joe Benton — Originating Scientist

B. David E Kissel — Department Head

D. David E Kissel — Chairperson, GAES Plant Cultivar and Germplasm Release Committee

E. _____ — Associate Director of the Appropriate Station

APPROVED:

Gale A Buchanan 1994/95

Director of Experiment Stations

Table 1. **Morphological characteristics of different tall fescue cultivars grown as spaced plants (n=72). Test conducted near Athens, GA during 1992-93.**

Cultivar	†Days to Heading	Seedhead Length	Flag Leaf Length	Flag Leaf Width	‡Plant Height.	1000 Seed wt.	Leaf Color
	no.	cm				g	
GA-Jesup Improved-EI	110	21.5	9.5	0.7	92	2.4	Green
Georgia 5 (E+)	107	25.0	13.7	0.8	98	2.6	Yellow Green
Kentucky 31 (E+)	113	25.6	11.4	0.7	91	2.4	Yellow Green
AU Triumph (E-)	100	21.2	10.7	0.7	98	3.1	Yellow Green
Rebel (E+)	118	22.9	10.6	0.7	65	2.2	Dark Green
LSD (5%)	2	2.4	2.3	NS	7	0.3	

†Number of days from January 1 to first seedhead emergence.
‡Height of unmowed plants just prior to heading.

Table 2. **Survival of tall fescue cultivars planted into bermudagrass at Winnsboro, Louisiana after two summer management conditions (continuous grazing or clipped for hay). Stands determined in January as a percentage of ground cover occupied by tall fescue. Data obtained courtesy of Wink Alison, LSU Northeast Research Station.**

Cultivar	Grazing		Hay	
	Year 1	Year 2	Year 1	Year 2
	----------%		----------	
GA-Jesup Improved-EI	85	61	67	37
Georgia 5 (E+)	77	53	42	35
Kentucky 31 (E+)	54	27	27	10
GA-Jesup Improved-EF	30	1	12	1
LSD (5%)	10	7	14	13

Table 3. **Yield and survival of different tall fescue cultivars in Ona, Florida managed in replicated clipped plots (data obtained courtesy of Paul Mislevy, Univ. of Florida).**

Cultivar	1992-93†	1993-94†	Final Stand ‡
	----------tons/ac----------		%
GA-Jesup Improved-EI	3.2 a§	1.6 a	71 a
Georgia 5 (E+)	3.1 ab	1.0 b	42 b
Kentucky 31(E+)	2.5 b	0.0 c	0 c
GA-Jesup Improved-EF	3.4 a	0.0 c	0 c

†Total of 5 harvests per season (autumn through early summer).
‡Percentage of ground cover occupied by tall fescue.
§Means followed by the same letter are not significantly different at the 0.05 level of probablility (Waller-Duncan k ratio, k=100).

Table 4. **Seasonal dry matter yield and stands (visual estimation of percent of ground covered with tall fescue) of different tall fescue cultivars managed in replicated clipped plots at Tifton, Georgia.**

Year	Cultivar	Winter	Spring	Fall	Stand
		----------lbs/acre----------			%
1988	GA-Jesup Improved-EI	690	4238	2422	100
	Georgia 5 (E+)	1344	5974	2110	98
	GA-Jesup Improved-EF	665	4801	1931	98
	AU Triumph (E-)	1208	4694	2757	98
	LSD (5%)	376	984	372	NS
1989	GA-Jesup Improved-EI	731	898	1987	100
	Georgia 5 (E+)	904	722	1068	98
	GA-Jesup Improved-EF	758	920	1226	94
	AU Triumph (E-)	1433	827	829	48
	LSD (5%)	NS	NS	332	11
1990	GA-Jesup Improved-EI	796	1227	1396	80
	Georgia 5 (E+)	1178	1108	597	48
	GA-Jesup Improved-EF	895	1433	429	38
	AU Triumph (E-)	1968	938	29	3
	LSD (5%)	350	NS	425	21

Table 5. **Total annual dry matter yield of different tall fescue cultivars at Tallassee, Alabama for three years. Data obtained courtesy of Edzard van Santen, Auburn University.**

Cultivar	1988	1989	1990	3 Yr Avg.
	----------lbs/ac----------			
GA-Jesup Improved-EI	5643	3377	1634	3551
Georgia 5 (E+)	5033	2926	986	2982
Kentucky 31 (E+)	5343	3141	973	3152
LSD (5%)	NS	443	464	NS

Table 6. **Beef steer performance (average daily gain) on continuously grazed spring (March-June) pastures at two grazing pressures during 3 years at Eatonton, Georgia.**

Cultivar	Grazing Pressure†	1993	1994	1995	3 Yr. Mean
		----------lbs/day----------			
GA-Jesup Improved-EI	High	0.40	1.02	0.56	0.66
	Low	1.01	0.88	0.94	0.94
GA-Jesup Improved-EF	High	2.16	2.30	1.85	2.10
	Low	2.30	2.50	2.68	2.49
Alfagraze Alfalfa	High	2.40	1.89	1.56	1.95
	Low	2.75	2.99	2.11	2.62
GA-Jesup Improved-EI & Alfagraze Alfalfa ‡	High	1.21	1.75	1.24	1.40
	Low	1.28	1.60	1.04	1.31
LSD (5%)		0.46	0.51	0.75	0.65

†Put and take system used to maintain low grazing pressure at 1400 lbs/acre and high grazing pressure at 700 lbs/acre of available dry matter. ‡Alfalfa as a percentage of available dry matter remained <15% for the grazing period.

Table 7. **Annual forage dry matter yield of different E- tall fescue cultivars and 'Shiloh' orchardgrass at three locations in North Georgia. Yield at each location is a yearly average calculated from 3 production seasons (1991-93) at each location.**

Cultivar	Athens	Calhoun	Blairsville
	----------lbs/acre----------		
GA-Jesup Improved-EF	5276	7078	9409
AU Triumph (E-)	5934	7627	10186
Kentucky 31 (E-)	5252	6943	9744
MSF 77-1 (E-)	5494	6955	9474
Shiloh Orchardgrass	4766	6596	8237
LSD (5%)	431	632	725

Table 8. **Stand of two E- tall fescue cultivars before (spring) and after (fall) continuous summer grazing at high stocking rate at two locations in Georgia during 1993. Stand determined as percentage of ground cover occupied by tall fescue using a point grid.**

Location	Cultivar	Spring	Fall	Survival†
		----------%----------		
Tifton	GA-Jesup Improved-EF	99	84	85
	AU Triumph (E-)	92	40	42
	LSD (5%)	NS	29	26
Eatonton	GA-Jesup Improved-EF	76	36	48
	AU Triumph (E-)	64	12	19
	LSD (5%)	8	NS	NS
Two Location Mean	GA-Jesup Improved-EF	88	60	66
	AU Triumph (E-)	78	26	30
	LSD (5%)	8	17	18

†Survival is based on spring stands (eg. spring/fall x 100).

Table 9. **Amount of bare ground exposed in plots of different tall fescue cultivars when managed under low maintenance turf conditions (clipping every 2-3 wk at 3-4 inch height, nonirrigated, and 8-8-8 complete fertilizer applied in fall @ 100 lbs N per acre) at Athens, GA during 1993 and 1994. Amount of bare ground determined as a percentage of ground cover not occupied by tall fescue during late October using a point grid. Test planted September, 1992.**

Cultivar	Initial	Final	
	1992	1993	1994
	----------%----------		
GA-Jesup Improved-EI	2	13	13
Georgia 5 (E+)	3	20	20
Kentucky 31	4	22	25
Rebel	2	42	36
LSD (5%)	NS	9	9

Table 10. **Performance of different tall fescue cultivars in a turf trial seeded in September 1992 at North Brunswick, New Jersey (data obtained courtesy of Reid Funk, Rutgers Univ.).**

Cultivar	Turf Quality† 1993	1994
GA-Jesup Improved-EI	2.8	2.7
Kentucky 31 (E+)	2.5	2.3
Georgia 5 (E+)	2.1	1.8
Falcon	3.5	3.2
Rebel Jr.	5.6	4.9
LSD (5%)	0.7	0.8

†Rating of 1 to 9 with 9=best turf quality when best turf quality is based on fine leaf texture and dark green color.

Table 11. **Performance of different tall fescue cultivars in a turf trial seeded in September, 1992 at Griffin, GA.**

Cultivar	Turf Quality 1993	1994
	--------Rating†---------	
GA-Jesup Improved-EI	4.0	4.3
Georgia 5 (E+)	3.7	3.9
Kentucky 31 (E+)	3.9	3.9
Falcon	4.3	4.3
Rebel Jr.	4.8	4.8
LSD (5%)	0.3	0.4

†Rating of 1 to 9 with 9=best turf quality when best turf quality is based on fine leaf texture and dark green color.