APPLICATION FOR RELEASE OF (check one):

☒ CULTIVAR   ☐ PARENTAL LINE
☐ ASSOCIATE CULTIVAR   ☐ GENETIC STOCK
☐ GERMPLASM

1. **Crop:** The Turfgrass: Seashore Paspalum (*Paspalum vaginatum* Swartz)

2. **Experimental no. or name:** UGP 73 (G07-033.4)

3. **Pedigree and history:** UGP 73 is a vegetative clone developed from a single F_1 seed arising from the hand-pollinated cross (PI 614678 X G05-1743). This cross was made in the greenhouse at Griffin, Georgia in 2007 by Dr. Paul Raymer. The female parent, PI 614678, is also known as Durban since it was collected at the Durban Country Club in South Africa. G05-1743 is an advanced line developed by the UGA seashore paspalum breeding program with semi-dwarf and fine leaf characteristics

Originally designated as G07-033.4, the single plant was germinated from seed in the laboratory and was established in the greenhouse. The seedling was visually screened for acceptable turf quality prior to being transplanted into the field for initial turf evaluation in the spring of 2010. G07-033.4 was evaluated in un-replicated field plots (2010 single plant nursery) mowed at 1.5 inches height of cut (h.o.c.) along with approximately 2000 other seedlings. G07-033.4 was one of 80 lines selected for further evaluation in the fall of 2010 based on turf superior quality, density, color, and resistance to dollar spot disease. Following selection, G07-033.4 was re-designated as UGP 73 and was clonally propagated and increased during the spring of 2011. UGP 73 was included in a group of 80 seashore paspalum lines in replicated trials at seven southern field locations (Griffin, GA; Tifton, GA; College Station, TX; Dallas, TX; Raleigh, NC; Gainesville, FL; and Stillwater, OK.) for evaluation of turf performance and drought tolerance as part of a USDA Specialty Crops Research Grant (SCRI). In this two-year evaluation over seven locations, UGP 73 ranked 2nd in overall turf quality out of 80 entries and ranked 1st in turf quality under non-drought conditions (data not presented).

In 2015, UGP 73 was increased clonally in the greenhouse for inclusion in the National Turfgrass Evaluation Program (NTEP) seashore paspalum trials at eight southern locations from 2016-2020. NTEP trial locations were Auburn, AL; Fayetteville, AR; Riverside, CA; Jay, FL; Griffin, GA; Mississippi State, MS; Stillwater, OK; and College Station, TX and h.o.c. at these locations ranged from 0.5 -2.5 inches. UGP 73 was also included in extensive trials associated with our second federal SCRI grant (2016-2019) where it was further evaluated for drought tolerance, salt tolerance, shade tolerance, and sod strength. In 2019, UGP 73 one of 23 advanced breeding lines and four standard cultivars included in a "greens" trial (0.110 to 0.175 in. h.o.c.). After the failure of an advanced line fairway trial (established in 2017) on the Griffin Campus, UGP 73 was included as one 28 entries in an

advanced fairway trial (0.625 in. h.o.c.) established in 2020 on the UGA Griffin campus.

4. **Description of plant material:** UGP 73 is a vigorous clonal line that produces excellent quality turf under a range of mowing heights (Tables 1, 8, 12, and 13) and is suitable for use on golf courses, athletic fields, and other recreational venues as a fine turf. UGP 73 has excellent turf color (Tables 2, 5, 12, and 13), good turf density (Table 3) and acceptable retention of color and quality during the fall and winter months following light frost or cool temperatures (Tables 4 and 5). In limited evaluations, UGP 73 has shown less winter kill than 'SeaIsle 1', 'SeaStar', and 'Salam' (Table 6). It is similar to other commercial cultivars with medium to fine leaf texture and good turf density. UGP 73 was initially selected for its drought tolerance and has demonstrated superior performance in numerous non-irrigated trials as well as over a wide range of irrigation regimes (Table 8). It has excellent salt tolerance, similar to SeaStar (Table 11), and better performance under shade than SeaStar and 'Platinum' (Table 10). UGP 73 has good resistance to dollar spot disease, *Clarireedia sp.* (Tables 7, 12, and 13) and has been shown to produce acceptable quality sod with good tensile strength (Table 9).

5. **Need for and potential users of plant material:** Golf course developments placed on coastal venues and problems associated with salinity are increasingly more prevalent issues in managed turfgrass. The trend for use of more salt-laden irrigation waters on turfgrass sites is expected to continue to rise and to further increase interest in developing more salt-tolerant grasses, especially halophytes such as seashore paspalum.

    The University of Georgia seashore paspalum breeding program is recognized as a major contributor to the success of seashore paspalum as a turfgrass species. However, our global market share of seashore paspalum plant materials has fallen dramatically due to the dominance of 'Platinum TE' in both domestic and international markets. A new superior cultivar is needed to improve our ability to compete in these markets.

6. **Justification for release:**

    A) UGP 73 has excellent turf quality over a wide range of mowing heights and has often outperformed Salam, SeaIsle 1, SeaStar, Platinum, and SeaDwarf (Tables 1, 8, 12, and 13).

    B) UGP 73 has excellent genetic color often better than Salam, SeaIsle 1, SeaStar, Platinum, and SeaDwarf. (Table 2, 5, 12, and 13)

    C) UGP 73 has demonstrated superior drought tolerance to SeaStar in non-irrigated trials and over a wide range of irrigation regimes (Table 8).

    D) The salt tolerance of UGP 73 is similar to that of SeaStar and better than that of SeaIsle 1 (Table 11).

    E) UGP 73 has demonstrated better tolerance to 60% shade than has Platinum and SeaStar (Table 10)

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7. <u>Participating scientists</u>: **Drs. Paul Raymer, Zengbang Chen, and Brian Schwartz**

8. <u>Location(s) at which plant material was developed</u>:   **UGA Griffin Campus**

9. <u>Recommended form of intellectual property protection and royalty</u>: **Plant Patent with license for marketing.**

Cultivar and associate cultivar applications only provide the following information:

10. <u>Method of propagation</u>: **Vegetative (Clonal)**

11. <u>Amount of breeder seed stocks available (if applicable)</u>: **N/A**

12. <u>Amount of foundation seed stocks available if applicable</u>: **N/A**

13. <u>Amount of cutting or bud material available for vegetatively propagated material for nursery distribution (if applicable)</u>:   **Approximately 1000 ft² of breeder plant material established on the UGA Griffin campus in 2019 and additional plant materials in greenhouses at the Griffin and Tifton campuses.**

14. <u>Describe any unusual difficulty anticipated in the production of any class of seed stocks</u>: **None.**

15. <u>Suggest up to three names for the cultivar, if appropriate</u>:

    Name to be determined by Licensing Committee or Licensing Group.

16. <u>Name approved by plant cultivar and germplasm release committee</u>:

APPLICATION FOR RELEASE

(Please keep this as a separate page)

Application for the release of (insert experimental name or number and crop)

Recommended:

A. ┌─ DocuSigned by:
    │ *Paul Raymer*
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    Originating Scientist   Date
    Dr. Paul Raymer

B. ┌─ DocuSigned by:
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    Department Head   Date
    Dr. Timothy Grey

C. ┌─ DocuSigned by:
    │
    └─ 953CA8D89B5646D...   01/23/2023 | 4:16 PM EST
    For Griffin, Assistant Dean   Date
    Dr. Jeffrey Dean

D. ┌─ DocuSigned by:
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    Associate Dean for Research   Date
    Harshavardhan Thippareddi

Approved:

F. ┌─ DocuSigned by:
    │ *Nick Place*
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    Dean and Director   Date
    Dr. Nick T. Place

Table 1. NTEP 2016 -2020 Seashore Paspalum - Turf Quality

NTEP Entry	2016 (1-9)+	2017 (1-9)	2018 (1-9)	2019 (1-9)	2020 (1-9)	Top Statistical Group	5 yr. Avg (1-9)
Salam	6.1*	6.1	6.0	6.0	6.2	2/5	6.1
Sea Isle 1	6.2	6.0	6.1	6.2	5.9	4/5	6.1
SeaStar	5.9	6.1	6.1	6.1	6.0	4/5	6.0
UGP 73	6.3	6.5	6.2	6.3	6.1	5/5	6.3
C.V.	4.4	1.3	2.6	2.1	3.0		
LSD	0.4	0.1	0.2	0.2	0.3		

+ Rated on 1-9 scale with 6 = acceptable and 9 = excellent
* Means in the top statistical group are bolded.

Table 2. NTEP 2016-2020 Seashore Paspalum – Genetic Color

NTEP Entry	2016 (1-9)	2017 (1-9)	2018 (1-9)	2019 (1-9)	2020 (1-9)	Top Statistical Group	5 yr. Avg. (1-9)
Salam	5.7*	6.2	6.2	6.6	5.9	3/5	6.1
Sea Isle 1	6.0	6.4	6.3	6.7	5.5	2/5	6.2
SeaStar	5.0	6.4	6.6	6.3	6.3	1/5	6.1
UGP 73	6.0	6.0	6.9	6.8	6.5	5/5	6.7
C.V.	4.5	2.8	2.5	4.4	5.7		
LSD	0.4	0.3	0.3	0.5	0.6		

* Means in the top statistical group are bolded.

Table 3. NTEP 2016 -2020 Seashore Paspalum – Fall Density

NTEP Entry	Riverside, CA (1-9)	Jay, FL (1-9)	Miss.St., MS (1-9)	Stillwater, OK (1-9)	Top Statistical Group	Table Avg. (1-9)
Salam	6.2*	6.4	6.8	6.4	4/5	6.4
Sea Isle 1	5.4	6.6	7.0	6.0	3/5	6.2
SeaStar	5.2	6.5	6.8	6.3	2/5	6.1
UGP 73	5.4	6.8	7.5	6.2	4/5	6.4
C.V.	8.7	9.0	6.1	2.9		3.9
LSD	0.8	1.0	0.7	0.3		0.4

* Means in the top statistical group are bolded.

Table 4. NTEP 2016-2020 Seashore Paspalum – Winter Quality

NTEP Entry	2016 (1-9)	2017 (1-9)	2018 (1-9)	2019 (1-9)	2020 (1-9)	Top Statistical Group	5 yr. Avg (1-9)
Salam	6.0	6.1	**5.7**	5.9	6.1	5/5	5.9
Sea Isle 1	5.3	**5.7**	**6.0**	**6.1**	**5.3**	5/5	5.7
SeaStar	**5.7**	**5.8**	**5.9**	**6.0**	4.8	4/5	5.6
UGP 73	**5.7**	**5.8**	**5.8**	5.9	5.1	4/5	5.6
C.V.	11.7	7.9	4.9	3.4	10.1		
LSD	1.0	0.7	0.5	0.3	0.9		

* Means in the top statistical group are bolded.

Table 5. NTEP 2016-2020 Seashore Paspalum – Color October

NTEP Entry	Auburn, AL (1-9)	Jay, FL (1-9)	Griffin, GA (1-9)	Stillwater, OK (1-9)	Top Statistical Group	Table Avg. (1-9)
Salam	5.9	6.3	**6.2**	6.2	1/4	6.2
Sea Isle 1	5.8	6.1	**6.3**	6.0	1/4	6.1
SeaStar	6.1	5.9	**6.2**	5.7	2/4	6.0
UGP 73	6.5	**7.0**	**6.2**	6.5	**3/4**	6.5
C.V.	7.6	7.0	6.0	4.1		3.7
LSD	0.7	0.7	0.6	0.4		0.4

* Means in the top statistical group are bolded.

Table 6. NTEP 2016-2020 Seashore Paspalum – Winter Kill

NTEP Entry	Fayetteville, AR (% winter kill)
Salam	22.5
Sea Isle 1	20.8
SeaStar	56.7
UGP 73	**9.2**
C.V.	22.0
LSD	11.6

* Means in the top statistical group are bolded.

Table 7. NTEP 2016-2022 Seashore Paspalum-- Dollar Spot Disease

NTEP Entry	Auburn, AL (1-9)	Jay, FL (1-9)	Miss. St., MS (1-9)	Table Avg. (1-9)
Salam	2.0	4.3	**7.0**	4.8
Sea Isle 1	2.7	**7.0**	**7.3**	5.7
SeaStar	**5.3***	8.3	4.7	6.1
UGP 73	**6.0**	5.0	**6.3**	5.8
C.V.	55.4	23.9	19.4	18.7
LSD	4.2	2.6	1.8	1.7

* Means in the top statistical group are bolded

Table 8. SCRI Seashore Paspalum Drought Trials-- 2017 – College Station, Texas

	Turf Quality (1-9)						
	Irrigation Frequency (times / month)						
SCRI Entry	0	1	2	4	8	Average	Rank
SeaStar	5.49	6.22	6.14	6.93	6.84	6.32	3
SR31-15-15	5.03	6.04	5.99	6.64	6.60	6.06	4
UGP 144	5.58	6.24	6.30	6.89	6.77	6.35	2
UGP 73	5.63	6.31	6.44	7.01	6.93	6.46	1

Table 9. Sod Handling Quality and Tensile Strength of Seashore Paspalum Oklahoma State University – 2017

Entry	Mean SHQ[1] (1-5)	STS[2] 14 MAP[3] (kg/dm)	STS[2] 18 MAP (kg/dm)	Mean STS[2] (kg/dm)
Salam	4.2*	115.9	70.9	93.4
Sealsle 1	4.3	106.6	68.3	87.4
SeaStar	4.2	104.3	53.1	87.0
UGP 73	4.2	89.6	**105.1**	**97.1**
Test Average (10 entries)	3.5	95.6	66.4	81.0

1. Sod handling quality rated on 1-5 scale with 3 = minimum acceptable and 5 = excellent.
2. 2. Sod tensile strength in kg dm^{-2} recorded at the peak force required to cause sod pad tearing using a hand winch and force transducer/recorder.

* Means in the top statistical group are bolded

Table 10. SCRI III Shade Trial – 60% Shade - Griffin, Georgia 2020-2022

Entry	Turf Quality (1-9)		
	Aug. 18, 2021	Aug. 17, 2022	2-Yr. Avg.
Platinum	4.10	4.27	4.18
SeaDwarf	4.83	**6.33**	**5.58**
SeaStar	3.60	4.93	4.27
UGP 73	**5.83***	5.70	**5.77**
Test Average (30 entries)	4.18	5.18	4.68

* Means in the top statistical group are bolded

Table 11. SCRI Greenhouse Salt Trial Seashore Paspalum – 2015 – Griffin, GA - Final Data at 45 dS

SCRI Entry	Visual Quality (1-9)	Visual Quality (% of control)	Visual Quality (% reduction)	Green Cover (%)	Total Biomass (grams)
SeaIsle 1	3.4	**55.0**	**45.0**	21.9	2.18
SeaStar	**4.1***	**58.3**	**41.7**	20.9	2.44
UGP 73	5.0	57.9	42.1	31.1	2.35
Test Avg. (9 entries)	4.2	57.1	42.9	24.7	2.32

* Means in the top statistical group are bolded

Table 12. Summary of 2020 Advanced Seashore Trial – Fairway (0.625 inch h.o.c.) – Griffin, GA

Entry	Cover Yr 1 (%)	Turf Quality (1-9)	Color (1-9)	NDVI (0-1)	Dollar Spot (%)
Platinum	93.3	7.2	7.3	0.71	**1.0**
SeaDwarf	86.7	6.8	7.6	0.70	3.0
SeaStar	**90.0**	7.1	7.9	0.71	15.0
UGP 73	91.7	7.6	**8.7**	**0.77**	**1.0**
Test Average (30 entries)	80.9	7.3	7.9	0.70	4.5

* Means in the top statistical group are bolded

Table 13. Summary of 2020 Advanced Seashore Trial—Greens Height (0.125 inch h.o.c.)—Griffin, GA

Entry	Establishment Cover (%)	Green up (1-9)	Turf Quality (1-9)	Color (1-9)	Fall Color (1-9)	Winter Color (1-9)	Seed Heads (1-9)	Dollar Spot (%)	NDVI[1] (0-1)	Stimp (ft.)
SeaDwarf	76.2*	8.2	6.8	6.0	6.4	6.4	6.5	5.1	0.64	7.2
Sealsle 2000	45.6	8.4	7.9	6.7	7.4	6.8	8.3	4.4	0.63	6.9
SeaStar	71.2	8.6	7.0	6.6	7.6	7.6	7.1	3.9	0.63	7.0
Platinum	60.0	8.5	7.1	6.8	7.5	7.4	8.1	4.8	0.64	6.9
UGP 73	56.2	8.5	7.1	7.2	5.8	5.8	8.1	3.9	0.65	7.1
Test Mean 28 entries	69.3	7.7	6.6	6.42	6.0	5.4	7.4	5.5	0.62	7.0

1. Normalized difference vegetative index is a measure of canopy density and color.
* Means in the top statistical group are bolded.