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(54) **SEASHORE PASPALUM 'SFX-14'**

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(52) **U.S. Cl.** **Plt./388**
(58) **Field of Search** Plt./388

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(57) **ABSTRACT**

A novel seashore paspalum cultivar (*Paspalum vaginatum*) is disclosed. The 'SFX-14' cultivar is characterized by having a fine texture when closely mown, superior tolerance to salt, drought, and soil hypoxic conditions.

5 Drawing Sheets

SUMMARY OF THE INVENTION

The present invention relates to a new cultivar of seashore paspalum (*Paspalum vaginatum* Swartz) that is particularly suited as a turf-grass for recreational fields and golf courses. The new cultivar of the present invention is herein referred to by its cultivar name 'SFX-14.'

The 'SFX-14' cultivar is a low growing halophytic grass spreading by rhizomes and stolons. The grass is particularly well suited for use on golf courses for tees and fairways mowed ⅝ inch–1½ inches, although tolerating mow heights as low as 7/32 inch (FIG. **3**). It is also suitable for lawns and athletic fields or any other area where a moderately fine textured close mown and low growing turf with superior salt tolerance is desired.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is shows a comparison of the inventive cultivar with a Florida native (natural) ecotype and four improved turf-type varieties. These varieties, from left to right, are Florida native type, 'SeaIsle 1' (University of Georgia release), Applicants' inventive variety 'SFX-14', Applicants' seashore paspalum variety named 'SGX-6' (Ser. No. 09/502,904), and Applicant's seashore paspalum variety named 'SDX-1' (Ser No. 09/759,481).

FIG. **2** shows a closer view of the turf samples shown in FIG. **1**.

FIG. **3** is a closer view of the turf samples shown in FIG. **1**.

FIG. **4** shows seedheads form various seashore paspalum varieties. These varieties, from left to right, are Florida native type, 'SeaIsle 1' (University of Georgia release), Applicants' inventive variety 'SFX-14', Appliants' seashore paspalum variety named 'SGX-6', and Applicant's seashore paspalum variety named 'SDX-1'.

FIG. **5** shows DNA amplification profiles of 'SFX-14' variety, 'Adalayd' (expired patent), Applicants' 'SGX-6' variety, and native seashore paspalum.

DETAILED DESCRIPTION OF THE VARIETY

The following is a detailed description of the new grass variety based upon observation of the grass grown in field plots and under live golf conditions on a local golf course.

FIG. **1** represents plugs of Seashore paspalum sod for one Florida native ecotype and four other seashore pasplum varieties, including Applicants' present 'SFX-14' variety. Beneath each sod plug is a stolon from each variety collected where grass was encroaching on unvegetated ground adjacent to the established grassed areas. The four turf-type sod samples represent the stand 120 days following sprigging, maintained with slightly brackish water (2,000–5,000 ppm) grown in a 90:10 sand-peat zone blend. The appearance of the three turf-type grass varieties of 'SeaIsle 1', 'SFX-14', and 'SGX-6' represent a maintenance regime with a mow height of 2.5 inches (6.35 mm) followed by a period of two weeks without mowing prior to collection and photographing. The 'SDX-1' variety was unmown.

FIG. **2** shows differences in the amount and vigor of growth exhibited in the 'SFX-14' variety from two weeks following the last mowing. While shoot growth vigor is more prominent with the Applicants' 'SFX-14' variety, seedhead production is more prominently observed with the 'SeaIsle 1' variety. Seedheads are more numerous in the 'SeaIsle 1' stand and observed culm length and raceme length are grater than the 'SFX-14' variety at the same age, same growing conditions, and same growing media. The stolons also represented approximately two weeks of growth, and the vigor, length, and amount of secondary branching is clearly noted. 'SeaIsle 1' has few secondary branches and part of the stolon is devoid of shoots. While approximately equal in overall length, the 'SFX-14' stolon has shoot development along the entire length of the stolon and is rebranched almost the entire length of the stolon.

FIG. **3** shows a closer view of the turf grasses shown in FIGS. **1–2**. Under same growth and maintenance conditions, the difference is clearly noted between the 'SFX-14' variety and the Applicants' 'SDX-6' variety in that the 'SDX-6' variety is shorter in overall height, forming a denser and tighter sod, and has shorter stolon growth and denser development of shoots along the stolon and the secondary branches of the stolon.

FIG. **4** shows typical seedheads for each turf-type variety grown under the same conditions, notwithstanding the fact that the size and appearance of the seedheads vary somewhat within a variety.

Asexual Reproduction

The 'SFX-14' grass was developed by the Applicants on Pine Island, Fla. in a saline environment. Florida native ecotypes were collected from salt marsh locations and commingled in mixed populations with an old cultivar of seashore paspalum, 'Adalayd'. These mixed population strains were maintained under close mown conditions with high traffic stress and saline irrigation. During periods of seed head production, the grasses were allowed to flower and produce seed. The seeds were allowed to drop and germinate naturally. With the resumption of close-mown conditions and high traffic stress, certain selections of this grass were isolated from the mixed colonies and asexually propagated. Trial areas of the asexually-propagated grass (i.e. 'SFX-14' cultivar) were established and maintained under live golf conditions at Alden Pines Country Club in Bokeelia, Fla., a salt water irrigated golf course, since 1994. The age of plant observed for botanical description was approximately 180 days old. All subsequent asexual reproductions of the 'SFX-14' grass observed to date have been true to the original variety and remain true to type when asexually reproduced. This grass selection, while similar in appearance and form to applicants' 'SGX-6' seashore paspalum cultivar, is particularly well adapted to mow heights greater than typical putting green mow heights. Namely, this grass is superior for utilization on golf tees, fairways, and roughs compared to Applicants' 'SGX-6' variety.

This grass has been asexually propagated by the applicants as sprigs, plugs, and sod.

Botanical Description

The 'SFX-14' cultivar is a perennial grass. The grass stems have overlapping sheath margins and arise from an extensive system of long, straw colored, slender rhizomes and/or purple-tinged stolons. The grass blades are glabrous and folded, forming a V-shape. The grass blades have an oilve green color, Munsell color designation 7.5 GY 4/6 (abaxial side) and 7.5GY 5/4 (adaxial side). The blade length is generally 2–2.5 cm (unmown). The blades have a typical width of from 1.8 to 2.1 mm, varying with the level of salinity, and taper to an involute apex. Leaf-blade venation of the variety is parallel without cross veins. Veins are obscure and include a prominent mid-vein. Leaf margins are smooth, and leaf-sheath auricles are absent. Upon flowering, the culms are about 5–10 cm tall with inflorescence forming paired branches (racemes) at the culm apex. The racemes are about 1.5 to 2.5 cm in length, each having a broad, triangular rachis bearing two rows of spikelets (one floret per spikelet). Ligules have an eciliate membrance. The collar does not have an external ligule.

Upon flowering, culms are mostly 1.5–3 cm tall with terminal inflorescence subtended by an unspecialized leaf-sheath. The inflorescence of the variety bears well-developed spikelets at emergence, forming paired branches (racemes) at the culm apex about 0.8–2.25 cm in length. Racemes having a broad triangular rachis with spikelets (one floret per spikelet) borne in two rows. The variety has an angular, narrowly winged rhachis, which is tough, persistent, 1–2 mm wide, and terminates in a spikelet. Spikelet packing is regular, two-rowed, abaxial, and contiguous, with subequal internodes. Florets (seed) are ovate, having a size of 0.5–0.75 mm in diameter. Glumes, palea, and lemma are awnless, glabrous, and green, with an acute apex.

Leaf blade width and length of the 'SFX-14' cultivar are affected by both salinity level and by the length of sunlight exposure. Likewise, as salinity levels increase, shorter, narrower, and somewhat more erect leaf blades are produced, compared to longer, wider blades produced upon irrigation with a fresh water or low salinity system.

General Observations

The 'SFX-14' cultivar has been tested under long term saline irrigation up to 15,000 ppm and has also survived seawater flooding from tropical storms and hurricanes. Saline irrigation (10,000 to 15,000 ppm) has shown to severely restrict potential disease, insect, and weed pests of this grass under close mown conditions and high traffic stress. The applicants have also utilized periodic seawater and brine water (45,000 ppm) drenches for pest control with no apparent or lasting damage to the grass. Direct applications of table salt or sea salt have also been employed for weed control, although temporary burning of the grass leaf tips have been observed with heavy salt applications.

Compared to 'Adalayd' seashore paspalum (a cultivar produced and sold by others), which is utilized for similar purposes, the 'SFX-14' cultivar has foremost greater salinity tolerance and, under saline conditions, improved density, finer texture, greater sod strength, increased rooting, and improved color (the winter color is more true (i.e. remains green) compared to the 'Adalayd', which gets more of a blue tint in the winter months). Compared to other fine textured grass species for similar uses (notably common and hybrid bermudagrass), this grass has adaptations for moderate to heavy shade tolerance and enhanced temperature tolerance, retaining color at lower temperatures than bermudagrasses. This grass has withstood cold temperatures to −5° F. in a Branch County, Mich. field trial area. This grass has enhanced qualities for drought tolerance and can be grown in sandy soils as well as in heavy textured waterlogged soils.

Also, this grass has a better tolerance to soil hypoxic conditions than the 'Adalayd' grass.

Compared to 'SeaIsle' variety, the Applicants' 'SFX-14' variety maintains a salinity threshold tolerance that is much grater (up to 20,000 ppm TDS). Under the same growth conditions, the Applicants have observed 'SeaIsle 1' to have an upper salinity tolerance threhold of about 7,500 ppm TDS. At salinities exceeding 7,500 ppm, 'SeaIsle 1' is observed to experience death.

Compared to SFX-14, the Florida native seashore paspalum ecotypes utilized in the inventors' program have leaf blades that are coarser (3–8 mm wide), longer (3.5–15 cm long), and have a much higher overall shoot height (often excceding 50 cm unmown), with a culm height often exceeding 60 cm. Raceme branches of the Florida native seashore paspalum ecotypes are much longer than those of the SFX-14 variety, typically 4–8 cm in length. The Florida native seashore paspalum ecotypes also do not exhibit significant rhizome development (being primarily stoloniferous), do not form a dense, thick stand of grass suitable for most turf grass applications, nor do they form a strong turf grass sod (although deeply and extensively rooted). The leaf blade vascular bundles of the Florida native seashore paspalum ecotypes are tough and fibrous and therefore do not exhibit good turf grass mowing characteristics, leaving protrusions of fibers extending from the cut edge of the leaf blade. The SFX-14 variety exhibits better winter color retention compared to the Florida native seashore paspalum ecotypes. The Florida native seashore paspalum ecotypes do exhibit greater salinity tolerance than the SFX-14 variety, however. Table 1 below shows a comparison between the SFX-14 variety and native Florida varieties.

TABLE 1

	SFX-14	FL Native
Leaf blade width	1.8–2.1 mm	3–8 mm
Leaf blade length	2–2.5 cm	3.5–15 cm
Culm height	5–10 cm	50–70 cm
Raceme branches	2 - paired	2 - paired often w/ 1–2 digitate
Raceme length	1.5–2.5 cm	4–8 cm
Growth habit	Strong stoloniferous and Strong rhizomanous	Stoloniferous and Weakly rhizomanous
Turf density	High	Low

TABLE 1-continued

	SFX-14	FL Native
Sod strength	Very High	Low to Moderate
Mowing quality	Very Good	Moderate to Poor
Salinity tolerance	High (>15,000 ppm TDS)	Very High (>45,000 ppm TDS)
Winter Color	Good	Poor

In summary, the Applicants' 'SFX-14' variety exhibits improved salinity tolerance (greater that 20,000 ppm TDS), has fine-texture under closely-mown conditions (vertical leaf blade orientation at/below 0.5 inches) compared to Adalayd and 'SeaIsle 1' varieties), and has low water consumption compared to other turf species, in particular St. Augustine and hybrid bermudagrasses. The 'SFX-14' variety has superior tolerance to soil hypoxic conditions compared to Adalayd and other turf species and has superior cold tolerance, winter color, and disease tolerance compared to Adalayd and 'SeaIsle 1'.

DNA Analysis

Comparative DNA amplification profiles of 'SFX-14', applicant's 'SGX-6' seashore paspalum cultivar, 'Adalayd' grass, and a native seashore paspalum produced by the University of Tennessee Plant Molecular Genetics laboratory are shown in FIG. **4**. "Ladder" denotes the molecular size markers in the left-most and right-most lanes, "214-1" is the 'SFX-14' grass, "215-2" is the 'SGX-6' grass, "215-5" is the 'Adalayd' grass, and "215-6" is a native seashore paspalum. The profiles were generated using known DAF techniques with two different primers (8.6i and 10.6e) see e.g., Caetano-Anolles, et al *Bio/Technology* 9:553–557 (1991); U.S. Pat. No. 5,413,909; Bassam and Bentley, *Biotechniques* 19:568–573; U.S. Pat. No. 5,643,479). Based upon these results, it has been determined that the applicants' 'SFX-14' grass is genetically different from the native grass, 'Adalayd' grass, as well as Applicants' 'SGX-6.'

We claim:

1. A new and distinct cultivar of seashore paspalum grass, substantially as herein illustrated and described, characterized by its fine texture when closely mown and its superior tolerance to salt, drought, and soil hypoxic conditions.

* * * * *

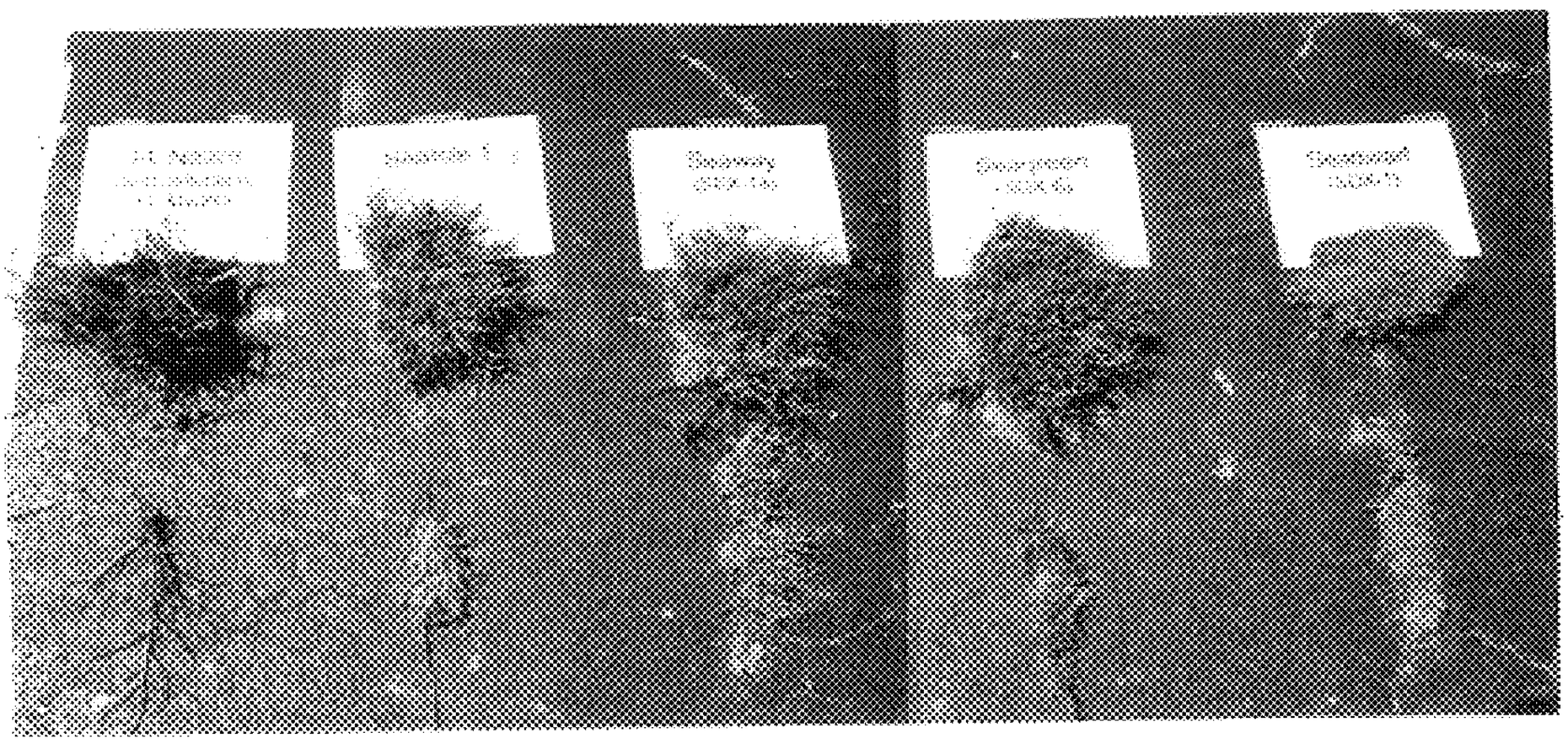

FIG. 1

FIG. 2

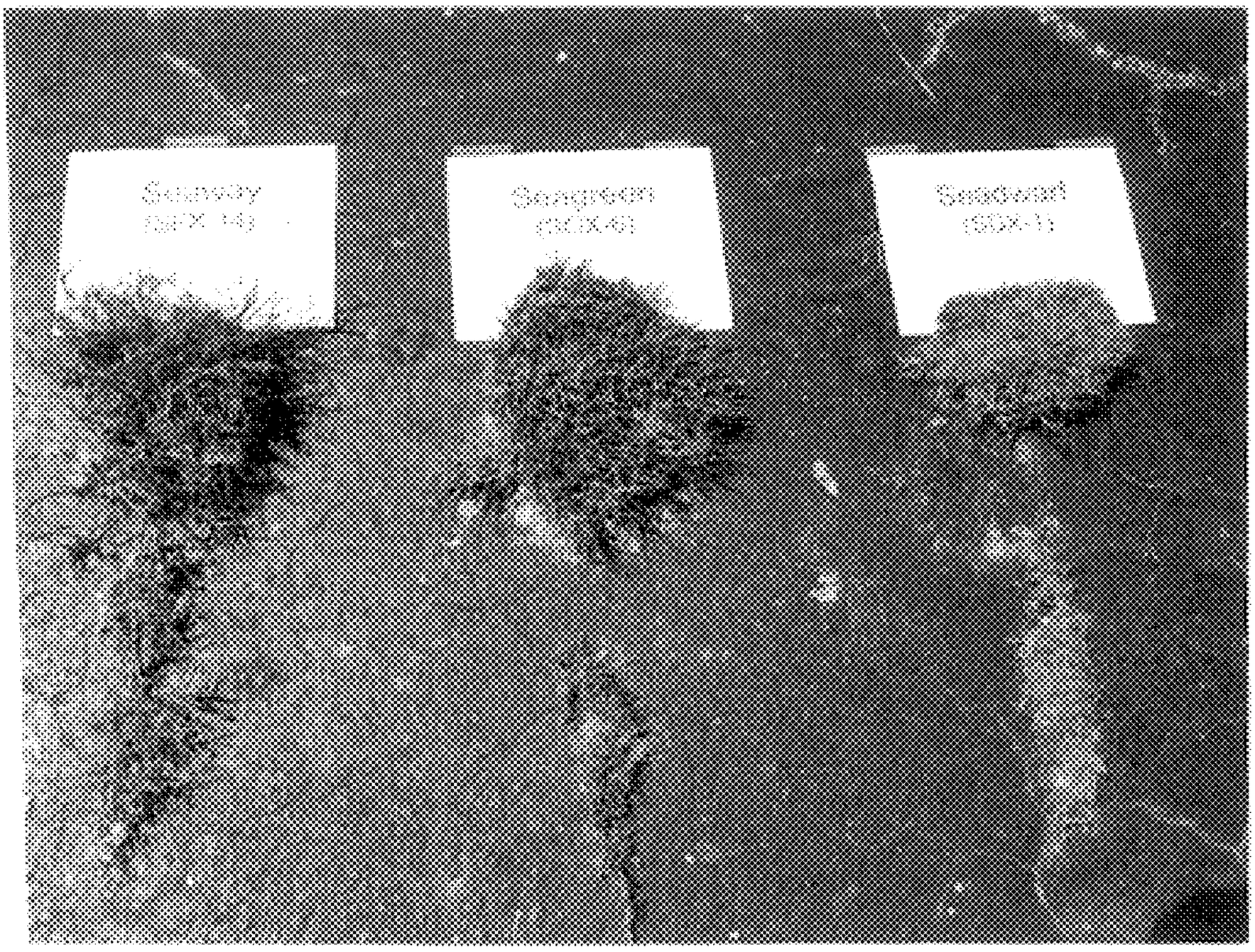

FIG. 3

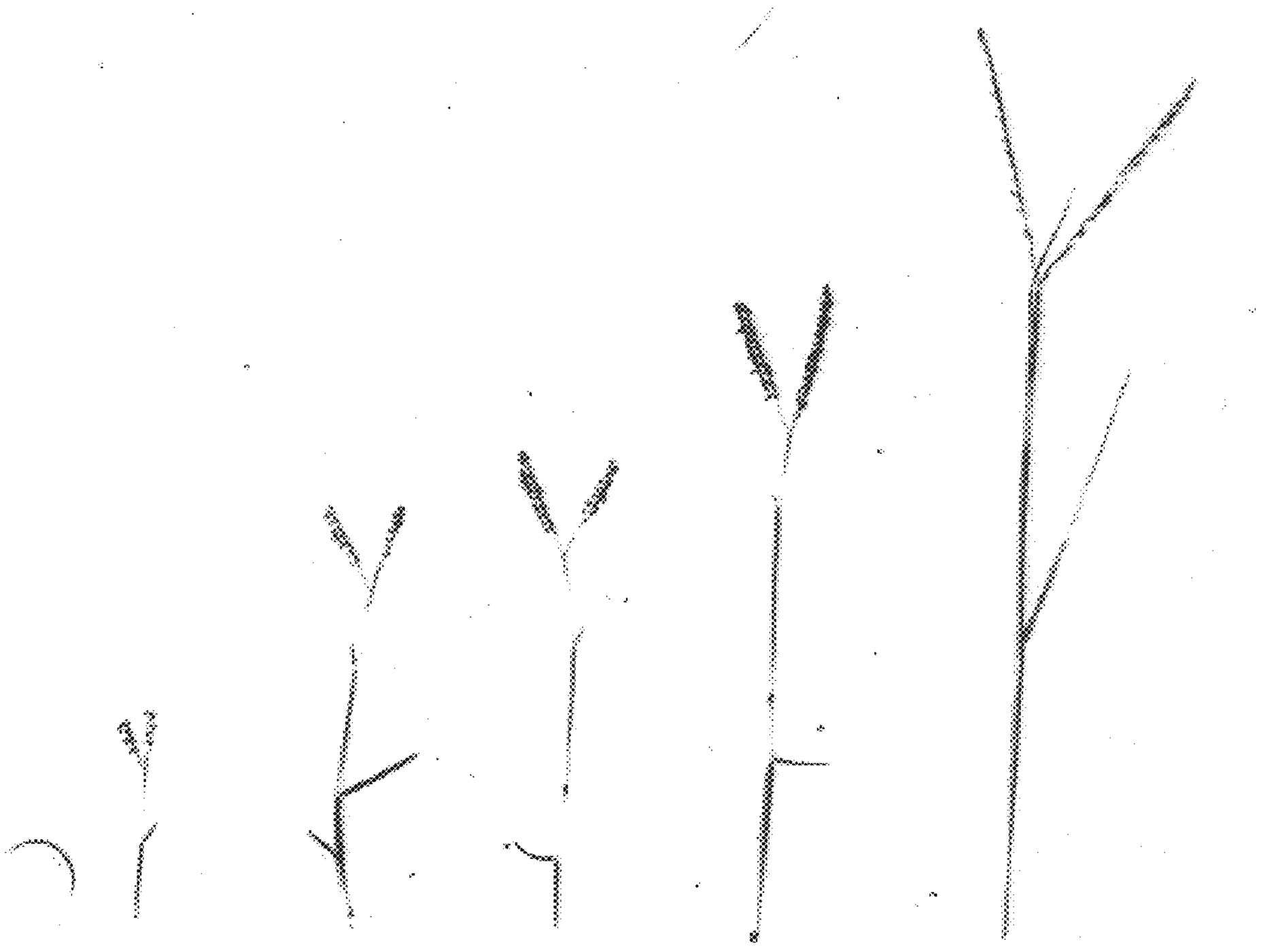

FIG. 4

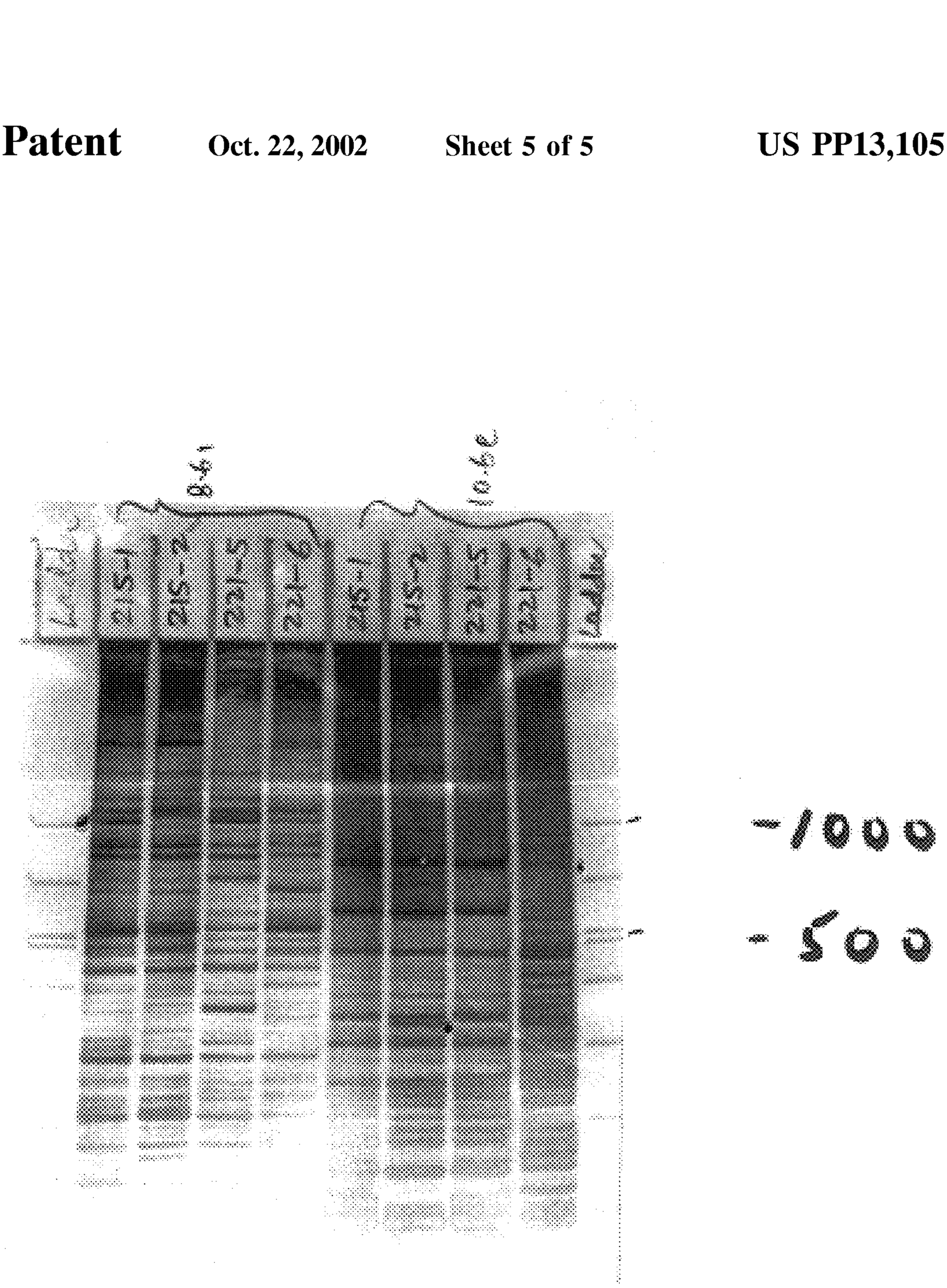

FIG. 5