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MANAGEMENT OF BENTGRASS PUTTING GREENS IN THE WEST

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Maintenance of a high quality putting green is dependent upon a number of regular management practices. Neglect of any of these practices will lower the quality of the turf and of the putting surface.

The practices suggested below are general and must be modified to meet the specific requirements of each course and sometimes to that of individual greens.

Good green maintenance starts with good construction and the proper planting of the best adapted bentgrass strains. Congressional, Old Orchard, and Cohansey are strains of superior performance in much of the West. A mixture of Arlington and Congressional has also performed well in this region.

FERTILIZATION

The application of 10 lbs. of 0-20-20 fertilizer per 1000 sq. ft. in the spring and fall should satisfy the phosphorus and potash requirements on most greens. As an excess of phosphorus in the soil may not be desirable, application rates should be reduced if soil tests show a high level. During the remainder of the year nitrogen will be the principal nutrient which must be supplied. A pound or a pound and one-half of actual nitrogen per month for each 1000 sq. ft. of area will normally be needed. This can be supplied in several ways. A soluble nitrogen material such as ammonium nitrate, ammonium sulfate, calcium nitrate, or urea may be used either dry or dissolved in water and sprayed onto the green. These materials should be applied every two weeks at rates to supply 1/2 to 3/4 of a pound of actual nitrogen per 1000 sq. ft. It is not a good practice to apply a full month's supply in a single application. During hot summer weather, weekly applications of 1/4 of a pound of actual nitrogen per 1000 sq. ft. are recommended. This method has the advantage of permitting the maximum degree of control over the nitrogen level. As each fertilization is supplying the nitrogen requirement for only a short period of time, amounts and timing can be varied readily according *to* weather conditions.

Organic materials, such as activated sewage sludge, in monthly applications to supply the one to one and one-half pounds of actual nitrogen per 1000 sq. ft. of area may be used instead. These materials have the advantages of slower nitrogen release and greater safety, permitting the application of larger quantities at less frequent intervals. However, the superintendent will not have the control over the nitrogen level permitted by the first method, a fact of great importance in periods of hot or changing weather. If organics containing phosphorus are used,' the spring and fall phosphorus applications may be eliminated and potash only supplied at these times.

A third possible method is to use one of the new Urea-Form sources of nitrogen. These, too, are safe and because of the low nitrification rate the nitrogen requirements for two months or more may be supplied in a single application. Here, as in the second method, some control may be sacrificed for convenience and saving of labor.

Many greens show benefits from periodic applications of iron sulfate as a foliage spray. Rates of application are generally 2-3 oz. per 1000 sq. ft. in enough water to uniformly wet the grass with a minimum of run-off into the soil. Liming is not as necessary as in the East. Applications of lime should be made if soil tests show the development of an acid condition.

WATERING

Greens, like all turf, should be watered according *to* the need. Frequency of watering will depend upon the soil, weather, and rooting depth of the grass. In general, sufficient water should be applied at each irrigation to thoroughly wet the soil below the root zone. Sometimes it may be necessary to hand water carefully between the regular irrigations. For best grass growth, it is wrong to water a green excessively in order to maintain the softness desired by the golfer. A green built on a good soil, high in sand, and given regular aerification, will not become hard. Early morning watering will reduce diseases and take the place of poling to remove dew. During periods of high temperature or warm winds, frequent light syringing of the greens may be necessary to prevent wilting and subsequent loss of the turf.

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Seldom is it possible to water all greens on a course on one program or schedule. Every green must be watered according to its own individual specific requirements. Proper watering of greens demands the maximum in skill, knowledge and observation from the superintendent. The best man on the superintendent's staff should be assigned this job.

MOWING

Greens should generally be mowed at 3/16 to 1/4 of an inch throughout the year. During the seasons of most active growth, dailymowing is best. A lesser frequency may be acceptable during other times. Brushing before mowing and cross mowing will help to prevent the development of mat and grain. Occasional use of the vertical mower will also be valuable in reducing these problems.

AERIFICATION

Aerification may be required on many greens to break up a compacted soil surface and to destroy soil layers which develop. Regular aetification on a definite schedule may be followed to prevent the development of these undesirable conditions. The type of machine which cuts a plug or core of turf is usually better than the spiker. Cores may be removed from the green ot crumbled and filled back into the holes by dragging. If the cores are removed a top-dressing high in medium coarse sand of uniform particle size may be used to refill the holes. Bentgrass greens should be aerified during the spring and fall months only. Growth may be too slow during the winter months to properly cover the holes. Drying at the edges of the holes may occur during hot weather preventing quick healing. Light use of a spiker will destroy any crust on the soil surface which may form during the summer.

WEED CONTROL

The best weed control method is the maintenance of a good solid turf by following the practices described in this paper. Poa annua, crabgrass, chickweed,etc., are more of a problem in a weak turf. Herbicides should be used with caution on putting green turf. Greatly reduced application rates are usually necessary to prevent damage. Poa annua may be partially controlled by reducing the rate of phosphorus fertilization, regular aerification, careful watering and annual late summer applications of standard lead arsenate. Repeated light applications of phenyl mercuric acetate or disodium methyl arsonate may be used for the control of crabgrass. Dichondra and other broad-leaved weeds can be controlled with 2,4-D at one-half or less the recommended rate if applications are repeated.

DISEASE CONTROL

Dollar spot attacks are most likely where temperatures are moderate and the grass is moist or humidity is high. Nitrogen fertilization as recommended above will help control this disease. Cadmium or chromate fungicides may be applied every 2 to 3 weeks as a preventative. These fungicides will also control copper spot. Brown patch will be a problem only when temperatures and humidity are high. Applications of mercury, chromate or antibiotic fungicides at bi-weekly intervals may be used as a preventative treatment. Curvularia fadingout, which strikes most often during hot weather, can be controlled with phenyl mercuric acetate or antibiotic fungicides. Malachite green is effective against *Pythium* and fall or winter applications of mercury against snow mold. Many times quick identification of a disease will not be possible. The new "broad spectrum" fungicides which will control a number of diseases are valuable in these situations.

INSECT CONTROL

The sod webworm or lawn moth is the ***most*** common insect pest on greens. DDT, chlorodane, or toxaphene at 2 ounces per 1000 sq. ft. are effective control sprays. The insecticide should uniformly cover the blades and should not be watered into the soil. Toxaphene and DDT will also control cutworms, skippers, and lucern moth. Chlorodane at 4 ounces per 1000 sq. ft., watered into the soil, can be used to destroy white grubs. The pyrethrum test will indicate the presence or absence of webworms and cutworms. Apply two teaspoons of 2% pyrethrum in one gallon of water to one square yard of turf. The webworms and cutworms will be brought to the surface in 10 minutes. If no larvae appear, other possible causes of the damage should be investigated.

TOP-DRESSING

Top-dressing is used to maintain a smooth true putting surface. Indiscriminate use of top-dressing can be an expensive and even harmful practice. Top-dressing should not be applied over a heavily matted turf, The mat should be removed with a rake or vertical mower so that the material will contact the soil surface. A good top-dressing should be high in sand and may contain peat or other organic matter. Top-dressing of the same composition should be used for every application. Frequent changes in the type of top-dressing will produce harmful soil layers. Application should be made only when necessary to produce an improved surface. The spring and fall seasons when the grass is growing vigorously are the best times.

VEGETATIVE PROPAGATION OF GRASSES

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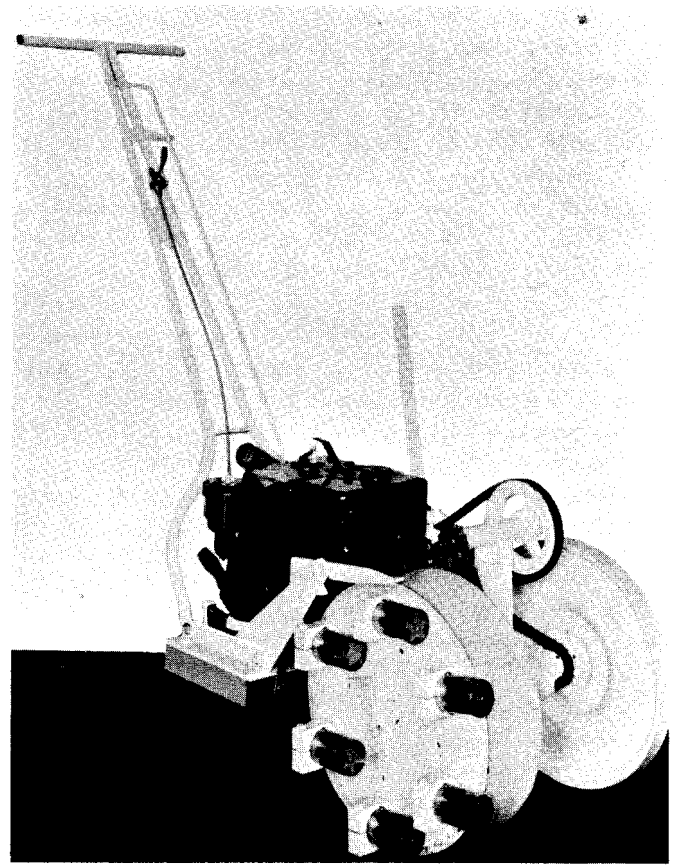
A large number of improved strains of bermuda, bent and Zoysia grasses have been introduced in recent years. Most of these strains must be propagated from plant material since they are either sterile, producing no viable seed, or are heterozygous and will not be true to type if grown from seed. This vegetative propagation can be by sprigging, broadcasting chopped plant material, plugging or sodding. Often a lack of understanding of the planting methods prevents the use of these new superior grasses.

A successful vegetative planting, whether a home lawn, an athletic field, golf green or any other turf area, requires the same amount and type of soil preparation as would any area being prepared for seeding. For small area plantings this would entail tilling the soil, correcting for surface and sub-surface drainage through the use of amendments and installation of drainage systems. As a part of the tilling operation a 5-10-5 or similar complete fertilizer at a rate of 15 to 40 pounds per thousand square feet should be incorporated into the soil. With the desired final surface grade established serious consideration should be given to fumigation of the seedbed, using any one of the fumigants according to the manufacturer's directions to eliminate most of the weeds, weed seeds, insects and diseases.

At this point we can choose our method of planting, either sprigging, plugging, or sodding. To briefly describe the different methods we can start by identifying a sprig as a stem having one or more joints (called nodes). These sprigs or stolons are prepared for planting by chopping or shredding and the cut pieces broadcast uniformly, usually by hand, over the prepared bed at rates of 3 to 5 bushels per thousand square feet for Zoysias and bermudas and from 5 to 10 bushels per thousand for bents. The material is next lightly rolled to press it into the soil surface, then topdressed with from 1/2 cubic yard of prepared top dressing for bents to 3/4 cubic yard for the bermuda and Zoysias per thousand square feet of area and again lightly rolled. The new planting must be watered lightly immediately. For the next few weeks, until new growth takes place, the soil surface must be kept constantly moist. The area should be mowed as soon as new growth reaches the clipping height with the clippings allowed to fall and add to the density of the sod. The initial mowings should be followed with light topdressing and rolling until a dense sod is formed. This sprigging method will produce an established turf more quickly than the plugging method.



AN INTERESTING EXPERIMENTAL MODEL OF A POWER SOD PLUG CUTTER. IT IS CLAIMED THAT IT WILL CUT TEN THOUSAND PLUGS PER HOUR.

With the advent of power-driven equipment such as the sod cutter, soil shredder, renovators, and the standard tractor and disc, the cost of sprigging of large areas has been greatly reduced. The shredded or chopped planting material is broadcast with the use of a manure spreader or special planting equipment, followed with a light disking, rolling and watering. Again it is essential that the soil surface be kept constantly moist until new growth develops. The quantity of plant material required for a fairway would be 125-140 bushels per acre and 150-180 bushels per acre for tees.

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VEGETATIVE PROPAGATION OF GRASSES

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Plugging is another method of planting which has the advantage that the planting material is not as subject to drying out. This method is commonly used where a changeover in composition of turf is desired by plugging the new grass into existing turf. Research at UCLA by Mahdi (Southern California Turfgrass Culture, July 1956) has shown that the transition is extremely slow unless some means can be used to reduce the competition of the existing turf. One possible way to achieve this is to use a maleic hydrazide spray to temporarily check the growth of the existing turf and to simultaneously place a small quantity of organic fertilizer in the bottom of the plug holes as a stimulant for the plugs. Mahdi also found that the spread from 4" plugs in significantly greater than from 2" plugs. Spacing of the plugs on 18" centers is adequate with closer spacing contributing very little towards faster coverage. In spite of these measures, complete transition would probably extend over several growing seasons. Where plugs are placed on bare soil, coverage is fairly rapid with complete coverage in approximately two months. Here closer spacing would definitely contribute towards faster coverage.

A third method is known as sodding. Despite the labor-saving sod-cutting machine it is still probably the most expensive method of turf establishment. Due to the cost factor, the method is generally restricted to use on golf course tees and greens where a quick need for good turf may justify its use. The soil preparation is essentially the same as for the other methods with perhaps a little more emphasis placed on the final surface grade. This method requires more skill and care in the operations and may be more time consuming. In the nursery the sod is stripped with hand tools or with a power sod cutter adjusted to cut approximately 1/2" thick and cut from 2 to 5 feet in length for ease of handling. These strips are rolled up and taken to the new area, laid down and tamped lightly, followed with a light topdressing worked into the seams and watered to prevent drying. The use of pegs for temporary support may be necessary when sodding is done on slopes. Having an immediate turf established is the only major advantage gained by using this method.

The above are but three different methods of planting vegetative material and the choice of using one or a combination or modification of methods lies with the individual, depending on the quantity of planting material and type of planting tools one has on hand.

ANNUAL TURFGRASS FIELD DAY

PLANS ANNOUNCED

Mr. Frank Stewart, program committee chairman, has announced that the Fall Turfgrass Field Day will be held on Tuesday, October 21, 1958 at the Riviera Country Club, Los Angeles. The day's activities will start with registration at 8:00 a.m.

"Turfgrass Traffic Tolerance" has been chosen as the topic for the day. Arrangements are being made to have a number of outstanding speakers present various phases of this problem.

Lunch and dinner will be served at the Riviera Country Club.

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BERMUDAGRASSES FOR TURF IN THE SOUTHWEST

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Cynodon dactylon, bermudagrass or devil grass, although found abundantly over the southern half of the United States is not native. It was introduced to this country early in our history and spread rapidly over the south wherever there was adequate rainfall or irrigation water. India and the East Indies appear to be the most likely lands of its origin and from which it has spread to all tropical and subtropical parts of the world.

Two other species have been introduced to this country in more recent years for turf purposes. These are; *Cynodon transvaalensis,* Florida grass or African bermuda, and *Cynodon magennisii,* Magennis grass or Sunturf bermuda. A fourth species, Cynodon bradleyi, bradleyigrass or Bradley bermudagrass, has also been introduced for testing. These are all introductions from South Africa.

Numerous strains of *Cynodon dactylon* have been selected for turf purposes in recent years. Many of these are selections from natural populations while others are the result of work by plant breeders in the United States and other parts of the world. Very few of these varieties have found general wide acceptance but rather have been used in the localized areas where they are best adopted. Because of climate and soil differences a strain which meets the needs very well in one region may perform poorly in another. For example, disease tolerance is of great importance in Georgia but of little interest in the arid southwest where bermudagrasses are seldom troubled by disease. On the other hand, the ability to hold its color well in the winter is an important requirement of a bermuda for the mild areas of California.

Several fine textured bermuda strains tested and being grown to a limited extent appear to be varieties of the African bermuda, *Cynodon transvaalensis.* This species has also been used in species hybrids with *C. dactylon.*

A number of researchers have studied the interrelationships of the various species and strains. However, the picture remains confused. Cytological investigations have been the most revealing, but all investigators have not found the same chromosome numbers for the various species. The outstanding studies on this problem are those of Hurcomb (5) who found that the species examined formed a polyploid series with a basic chromosome number of 10. According to her counts, *C. transvaalensis* is diploid with the somatic number of 20°. *C. magennisii* is triploid with the somatic number of 30° and *C. dactylon* with 40 chromosomes is tetraploid. *C. bradleyi* has 18 chromosomes and is probably an aneuploid. Burton (2) counted 36 chromosomes plus several fragments in *Cynodon dactylon* growing in the United States. Andulow (1) and Janaki Ammal (3) also determined the count to be 36, while Hunter (4) counted 30.

The classic descriptive work on the *Cynodons* is that of Stent (6). Seven species, all common to South Africa, were described. Since that paper was published *C. magennisii* has also been assigned a species rank by Hurcomb (5).

During the past ten years a large number of species and varieties of *Cynodon* have been grown at UCLA, described and evaluated for turf purposes. Several of them are recommended for planting in California and the Southwest, while many others have no particular merits for this region. These observations are summarized below for most of the bermudagrasses which are being used in the west today, or show promise for future use. Because of the heterozygous nature of these grasses propagation is by vegetative methods only.

U-3 Bermuda

U-3 was one of the first selected strains of *C. dactylon* made in this country to find a broad and popular acceptance. It was found growing on the Savannah Golf Club in 1938 and selected by Mr. D. L. Hall who was then Superintendent. The U. S. Golf Association grew it in their nursery at Beltsville for several years and it was then released for general planting. Today it is perhaps the most widely planted of all the common bermudagrass varieties.

The texture of U-3 is considerably finer than common bermuda, the blades rarely exceeding 1/8 inch in width when grown as turf. The color is a dark green with a slight gray cast. The green color is not retained well during cool weather; however, the off-color period during the winter is generally a few weeks shorter than for common bermuda. It seldom produces viable

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seed in the cooler parts of California, but may do so in areas of high temperatures.

This strain has performed very well in all regions of the southwest where bermuda is adapted. Because of its great density, prostrate growth habit, and wear resistance, it is especially valuable for any area which will be given heavy use. U-3 is recommended for general lawn plantings, playgrounds, athletic fields, golf course tees, driving ranges and bowling greens in California. It competes well with common bermuda, dominating any mixed planting.

The seed from U-3 stolons which is sold by several seed companies appears to be somewhat superior to common bermuda for most uses. However, it is not the same as vegetatively propagated U-3 as a wide segregation of types has been observed from this seed. The recommended uses for U-3 apply only to the true strain, vegetatively propagated.

Everglades Number 3

A selection obtained from the Florida Agricultural Experiment Station, Everglades number 3, has been tested at UCLA and other parts of California for several years. This is an outstanding strain for color, being a rich dark green. In areas of mild winters, Everglades number 3 will remain green throughout the year.

The texture is comparable to that of U-3 but the growth habit is more upright. It is a rapid-growing grass which will form a solid cover under good growing conditions in one to two months, crowding out in time common bermuda which may be present.

Everglades number 3 rarely develops any seed heads except when temperatures are very high, and then no viable seed appears to be produced.

Everglades number 3 is one of the best bermudagrasses for home lawns. It is also recommended for golf course tees, playgrounds and as a superior substitute for common bermudagrass in any turf planting.

Cynodon magennisii, Sunturf

As previously mentioned, this species is a triploid hybrid of *Cynodon dactylon* and *Cynodon transvaalensis.* It was first grown at UCLA as USDA plant introduction number 213390 in 1954. It is an introduction from South Africa where it is a popular turfgrass. In 1957 the common name Sunturf was assigned to it jointly by several Southeastern experiment stations.

While this species at times may produce some seed heads, it has never been known to set viable seed. *Cynodon magennisii* is one of our finest textured bermudas, producing a prostrate, dense, dark green turf of excellent quality. It is one of the easiest bermudas to manage as it is slower to invade areas. surrounding the lawn than most other bermudas.

Green color is retained during cool weather better than U-3 but not as well as Everglades number 3. A noticeable amount of red pigment is developed in the leaves and stems during cool weather which may give a purple cast to the turf.

This is one of the outstanding bermudas for home lawn planting. It is also suggested for use on tees, bowling greens, and playgrounds. It is suggested as a possible grass for golf greens in areas where bentgrasses will not survive.

T-35A

This is a fine-textured strain obtained from the Texas Agricultural Experiment Station and grown at UCLA for a number of years. It is an extremely vigorous variety which will build up a thick mat in a short time in areas of high summer temperatures. The color is lighter green than the previously discussed bermudas. Color during the winter months is satisfactory only in the areas of mild winters such as the immediate coastal region of southern California. Seed stalks are seldom produced in any quantity sufficient to impair the quality of the turf.

Because of its great vigor it is recommended for general planting in the cool coastal regions only. Suggested uses are home lawns, playgrounds, golf tees and driving ranges.

Cynodon transvaalensis - African bermudagrass

One of the finest textured grasses grown for turf, African bermuda makes a turf of great beauty under favorable conditions and good management. This species has been grown in the United States for a number of years but because of certain management difficulties has never become popular. The color when well fertilized is a bright emerald green. Winter color is generally not good, as in addition to the loss of green, considerable red pigment develops at cool temperatures.

The great density of the turf and the relatively short blade length combine to create a problem of scalping which exposes an underlying brown mat. This mat builds up with great rapidity unless mowing is frequent and close. It produces numerous seed heads but little viable seed.

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Skaapplass fine, a strain of African bermudagrass introduced from South Africa as plant introduction number 213388, produces less of a mat and less red pigment. It may, therefore, be a better choice than the regular African if it becomes generally available.

African bermudagrass is not recommended for any specific uses. It may be used for home lawn plantings if the mat can be kept under control.

Ugandagrass

The exact relationship of Ugandagrass to the other bermudagrasses has not been established. However, it appears to the writer to be a strain derived from the *transvaalensis* species. In texture, color, and general growth habit it resembles this species. It differs sufficiently in several anatomical and morphological features to require its being placed as a distinct variety. Ugandagrass was introduced from Egypt as plant introduction number 183557.

Matting and scalping are not as severe problems as with the African bermudagrass. However, unless it is given close, frequent mowing, the mat will build up to the point of becoming troublesome. It produces some seed heads but little or no viable seed.

Ugandagrass is suggested for the following uses: bowling greens, putting greens and general lawns. It has been used successfully for tees on one golf course.

Iran bermudagrass

Very comparable to Ugandagrass, Iran bermudagrass was introduced from Iran as plant introduction number 210837. It differs from Ugandagrass primarily in being much more fertile, generally producing many viable seeds. Because of this fertility, its primary value may be as an excellent source of breeding material. In itself it shows no superiority over Ugandagrass.

Royal Cape

Royal Cape is a strain of *C. dactylon* introduced from South Africa as number 213387. This strain has retained better color during the winters at UCLA than any other bermudagrass grown. It is an attractive dark green, medium fine textured grass. Unfortunately, its growth habit is poor, tending to produce swirled clumps and mats which scalp readily. Some seed heads with a few viable seeds are produced during certain periods of the summer.

Royal Cape is not recommended for any turf uses but is being used extensively as a source of breeding material in the UCLA turfgrass breeding program.

Vereeniging

This strain of *Cynodon dactylon* was introduced from South Africa as plant introduction number 213389. It forms a dense turf of dark green color and holds this color well during cool weather. It is of medium fine texture, forming a smooth uniform turf. Vereeniging is generally rated high in tests throughout California.

Veteeniging may be useful for golf course tees, playgrounds and general lawn plantings. It, too, is being used in the trufgrass breeding program at UCLA.

Other strains

Tifgteen, Tifton 328, which is rated very highly as a bermudagrass for greens in the Southeast has not been tested sufficiently in California to determine what, if any, merit it may have here.

Tiflawn and Tiffine have not produced turf of good quality in California. Everglades number 1 has been inferior here in comparison with the strains discussed earlier in this article.

General Management

All bermudagrasses should be kept well supplied with nitrogen fertilizer for a quality turf. Close mowing at least once a week produces a smooth, tight turf. Watering should always be deep and only as the grass shows the need. Heavy nitrogen fertilization in the fall and winter will help all strains hold more green color during the winter. Periodic use of the vertical mower or bermudagrass rake will keep the mat or thatch under control.

Literature Cited

1. Andulow, N. P. Karyo-systematishe Untersuchung der Familie Gtamineen. Bull. Appl. Bot. Genet. etc. Suppliment 43. 1931.

2. Burton, Glen W. Intra-and Inter-Specific Hybrids in Bermudagrass. Journ. Heredity 42:152-156. 1951.

3. Darlington, C. D. and E. K. Janaki Ammal. Chromosome Atlas of Cultivated Plants. Allen and Unwin, London. 1956.

4. Hunter, A.W.S. A Karyo Systematic Investigation in the Gramineae. Canadian Journ. Research 11:213. 1934.

5. Hurcomb Ruth. A Cytological and Morphological Study of Cultivated Cynodon Species. Journ. South African Botany 13:107-117. 1947.

6. Stent, C. South African Species of Cynodon. Bothalia 2:274-288. 1927.

TALL FESCUE - PENSACOLA BAHIAGRASS COMBINATION

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A combination of tall fescue, *Festuca arundinaceae,* and Pensacola bahiagrass, *Paspalum notatum,* has been observed in plots at UCLA for the past two years. This combination is of promise as a heavy duty turf for playgrounds, athletic fields, parks, backyard lawns, and service areas.

The combination appears to have greater density and toughness than either material alone. Pensacola bahiagrass has a short thick rhizome near the surface and is tolerant of heat, growing at its best during the warmest weather of the year. Tall fescue, either Alta or Kentucky-31 strains, grows best during the cool season, producing new growth during the period when the Pensacola bahiagrass is dormant or making only slight growth. Both grasses are drought tolerant and capable of producing acceptable turf under low fertility levels.

The two species have kept in good balance during the period of observation. The tall fescue dominates during the winter and the Pensacola bahiagrass during the summer. There does not appear to be any transition period from one to the other when the color and growth is poor. While bermudagrass may eventually invade this combination, it appears capable of resisting this invasion for a long period of time.

Observations indicate that the proper proportions of the two grasses may be approximately 60% tall fescue to 40% Pensacola bahiagrass expressed as weight of seed. This seed should be planted at about six pounds per 1000 square feet of area. Planting this combination either in the early spring or early fall should give each grass a period of favorable weather to become established. Pensacola bahiagrass will not germinate well during the cool season.

Alta or Kentucky-31 tall fescue can be obtained from any western seed company. Pensacola bahiagrass may be obtained from most seed companies in southeastern United States if unavailable in the west.

ATHLETIC AND RECREATIONAL TURFGRASS ASSOCIATION

The following are the officers of the Athletic and Turfgrass Association for 1958

President: Frank Stewart
Forest Lawn Memorial Park

Vice-President: Bob Schies
Chaffee School District

Secretary: Tosh Fuchigami
UCLA

Treasurer: James McKenzie
University of Redlands.

For its third quarterly meeting a joint meeting was held with the Department of Parks and Recreation at Hanson Dam Park on June 11, 1958. Although commencement exercises and the close of the fiscal year prevented many of the regulars from attending, an interesting meeting and afternoon tour of the 1500-acre park area, dam, and recreational facilities were conducted. The morning session included discussions on the current dichondra disease problem, turf problems of special interest and the increasing use of chemicals in turfgrass management.

The Fall meeting is scheduled to be held at Cal Poly, Pomona, at which time the members representing commercial interests will be invited to take an active part in the meeting through displays and demonstrations.