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It's the guts of a tractor that make it run. And keep it running.

And no other grounds maintenance tractor has the guts of a Gravelly. THE STORY OF OUR LIFE.

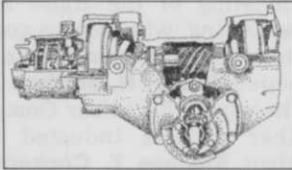
Beneath a Gravelly's impressive exterior, lies an even more impressive interior. Designed to give each and every Gravelly a long and lively life.

The Gravelly swiftomatic 4-speed transmission is a good example. Through years of performance, it delivers the precise speeds and power you need to do a lot of jobs a lot easier. And a lot better.

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Gravelly's famous all-gear direct drive. A transmission with a lot of teeth in it

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ALL-GEAR DIRECT DRIVE.

The exclusive Gravelly all-gear, direct drive from engine to attachments improves power transmission.

And because it is all-gear, it eliminates belts which are prone to break, slip or wear out.

MORE REASONS OUR CUSTOMERS HAVE GROWN ATTACHED TO US.

A Gravelly 2-wheel tractor operates 6 different mowing attachments alone. Other attachments are available for plowing, cultivating, snow removal and hauling loads. A Gravelly also powers a seeder, sprayer, sweeper, compost shredder, scraper and even a log splitter. Enough to handle just about every kind of grounds maintenance job imaginable.

THE LAST TRACTOR YOU'LL EVER NEED?

In addition to building tractors to last, Gravelly wants its attachments to last, too.



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WT&T

PEOPLE



The new officers and directors of the All-America Rose Selections, pictured above, were elected during their annual meeting held in conjunction with the 103rd Annual Convention and Trade Show of the American Association of Nurserymen in New Orleans in July.

Seated, left to right, are: **Fred Edmunds**, Roses by Fred Edmunds, Oregon, vice-president; **Larry Sjulín**, Inter-State Nurseries, Iowa, president; and **George Rose**, Iowa, secretary. Standing, left to right, are: Directors **Joe Burks**, Co-Operative Rose Growers, Texas; **Ollie Weeks**, Weeks Wholesale Rose Growers, California; **S. B. Hutton, Jr.**, The Conard-Pyle Company, Pennsylvania; **Dave Stump**, Jackson & Perkins, Oregon; and **Sam Welsh**, Mt. Arbor Nurseries, Iowa.



New officers and directors of the American Association were also elected during their annual meeting in New Orleans. Pictured above seated, left to right are: Treasurer **Henry A. Weller**, Congdon & Weller Nurseries, New York; President **Ernest A. Tosovsky**, Home Nursery Greenhouses, Illinois; Vice-President and Director, Region IV, **Hugh Steavenson**, Forrest Keeling Nursery, Missouri. Standing, left to right, are: Director, Region V, **Kent Langlinais**, Kent's Nursery, Louisiana; Director, Region VI, **Jerry Rosso**, J. Rosso Wholesale Nurseries, Washington; Director-at-Large **It-suo Uenaka**, Cupertino Nursery, California; Director, Region II, **John Wight, Jr.**, Wight Nurseries, Georgia; and Director, Region III, **David Farley**, Farley Brothers Nursery, Michigan.

Edward J. Duling of Lakeside, California, was installed 1978-79 president of the 900 member Southern California Turfgrass Council during a July meeting of the trade association in Commerce. Duling, who owns a commercial landscape maintenance firm operating in the San Diego area, succeeded **Sydney H. Gordon**. Gordon is associated with Robinson Fertilizer Company in Orange.

Other officers inducted included 1st Vice-President **Stephen T. Cockerham**, Rancho Verde Turf Farms, Perris; 2nd Vice-President **John F. Culbertson**, Pacific Turf Farms, Camarillo; Secretary **William H. Keyser**, Valhalla Memorial Park, North Hollywood; and Treasurer **Dan Castleberry**, Forest Lawn Memorial Park, Glendale.

The Council's nine-member board was completed with the installation of Directors **Dennis Frey**, Toro Pacific Distributing, Gardena; **Dave Mastroleo**, Hillcrest Country Club, Los Angeles; and **Don Schaich**, Stover Seed Company, Los Angeles.



Left to right: Outgoing President Gordon; newly-elected President Duling; Secretary Keyser, Treasurer Castleberry; and 1st Vice-President Cockerham.

Vernon L. Shallcross, Jr., has been appointed executive vice president of Green-Lawn, Inc., a professional lawn care company headquartered in Louisville, Kentucky. He will be responsible for administration and will operate out of the company's Tulsa, Oklahoma, office.

Shallcross said that the company plans to expand into several new markets in the coming year. "We see our largest potential to the south and west," he noted. "By dividing duties between the Louisville and Tulsa offices, we will operate more efficiently and be able to respond faster to opportunities in both old and new markets."

Green-Lawn currently has over 50,000 customers in Louisville and Lexington, Kentucky; Evansville, Indiana; Nashville and Memphis, Tennessee; and Tulsa and Oklahoma City, Oklahoma. Green-Lawn also franchised its first market this year in Jackson, Tennessee. The company has technical arrangements with Green-Lawn operations in several other states.

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bilities on many of the models.

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THE ULTIMATE WEAPON. COMBAT-PROVEN BY VETERANS.



Pictured left to right: Model 698, Model 608, Model 657, and Model 600. WEED EATER®, Inc., a subsidiary of Emerson Electric Co.

GROWTH IN TREE FERTILIZATION LINKED TO PROFESSIONAL METHOD

The value of property has risen significantly in the 1970s and with it the value of trees on property. It is curious why proper care of trees hasn't escalated at the same rate as property values.

A tree in the 15 ft. category installed easily costs the homeowner or business \$80. A small investment in annual fertilization is more than just a good idea, it is insurance.

The success of lawn care companies suggests that property owners are aware of the increased value of their landscape. Shouldn't this same realization of worth effect the tree care business? Perhaps it has to a degree, but tree care business has not appeared on anyone's list of greatest opportunity lately.

Residential and small industrial maintenance had been left to the small landscaper until lawn care companies, some of which were landscapers, cut right in with lawn maintenance.

The same complete care package could work well for trees. The package could be pruning, fertilization, and repair of winter damage in the spring; insecticide and fungicide treatments in late spring and summer; and mulching, fertilizing, and necessary winter preparation in the fall. The entire program could be one contract at a price per visit.

But like lawn care, tree care will need a universal technology to blossom. Although many lawn care companies are dry, the liquid spray technology made it boom. It became a unique occupation with the emergence of the tank truck.

The same type of technology is needed for tree care to boom.

The choices of fertilizing established trees have increased in number in the past five years. Most recently developed are the tree spike or capsule and the slow-release, ground-injected suspension. The system of injecting fertilizers, insecticides and other chemicals directly into the tree is also relatively new.

Perhaps the oldest method considered professional is the drilling of holes for insertion of dry fertilizer. And lurking behind all these methods, is the very practical, extremely simple method of surface application.

The success of lawn care spray rigs can be attributed to speed of application, rapid and dramatic improvement in the customer's lawn, the outdoor advertising value of the tank truck, professional brochures, and the ability to plan routes accurately and efficiently.

The spray rig has been successful despite much higher equipment costs.

The companies who perform the same tasks with dry chemicals have adapted to the benefits of

well-marked vehicles, reliable, one-man application methods, and efficiency. Another factor increasing efficiency is the routeman receives a healthy percentage of the business.

These same reasons for success can be utilized in tree care, when a dominant technology is chosen by professionals and recognized by the customer to be professional.

To determine the best, most professional method, each method must be examined for effectiveness, economy, and professional image. Comparative tests are needed which include all the methods.

Effectiveness

For established trees to achieve maximum health and growth, they should receive 5-6 lbs. of nitrogen per 1,000 sq. ft. of soil surface underneath. This area can be figured by multiplying the distance in feet from the trunk to the drip line (the radius) by itself, and then multiplying by 3.14 (known as pi).

For example, a tree that has branches extending out from the trunk 8 ft. would have surface area underneath totalling 200 sq. ft. ($8 \times 8 \times 3.14 = 200$). Consequently, the tree requires one lb. of nitrogen.

If the fertilizer being used is 10-5-5, then ten percent of the fertilizer is nitrogen, and ten lbs. of fertilizer need to be spread uniformly under the tree to give the tree one lb. of nitrogen.

All these figures can be computed ahead of time and made into a table (see table 1).

Not all methods of tree fertilization provide five lbs. of nitrogen when used as directed on the label, notably tree spikes and capsules. However, manufacturers of these products claim improved leaf growth and appearance of trees fertilized with their products. The question is, does the method provide improved growth and appearance to the level desired by a customer? *

Tests have shown when nitrogen is applied at fractions of the recommended amount, it does not produce results proportionate to the fraction.

Also, it is recommended that a third to a quarter of the nitrogen be in slow-release form.

The amount of phosphorus and potassium does not appear to be critical in tree fertilization unless a deficiency exists. Generally, these elements should be a third of the nitrogen amount of the fertilizer (i.e. 12-4-4). It has been shown that phosphorus and potassium do not migrate to the roots as well as nitrogen, which limits their effectiveness when applied to the surface.

Economy

Two critical factors in the economy of a method are labor and equipment.

The only equipment needed to place tree spikes is a hammer. Surface application requires only a spreader.

Tree injection requires a drill (or hammer). Vertical hole drilling requires a large drill or rod (in soft soil).

Liquid injection requires the most equipment, including a pump, tank, agitator, and injection nozzle.

From a time standpoint, drilling methods take the most time. Tree spikes probably take the least, followed by surface application, and soil injection.

The two least costly methods appear to be spikes and surface application. However, spikes do not provide the recommended five lbs. of nitrogen, and are actually more expensive on a cost per lb. of nitrogen basis. Surface application carries the threat of burning out turf in the area around the tree.

Soil injection, whether with solutions or suspensions, is the next choice from a time standpoint. However, equipment costs are high.

So, we are back to drilling, thus the dominance in the recent past of the vertical hole method. Equipment costs are higher than spikes or surface, but only a fraction of a spray unit.

The concept of drilling into the tree has not really achieved customer acceptance. People have

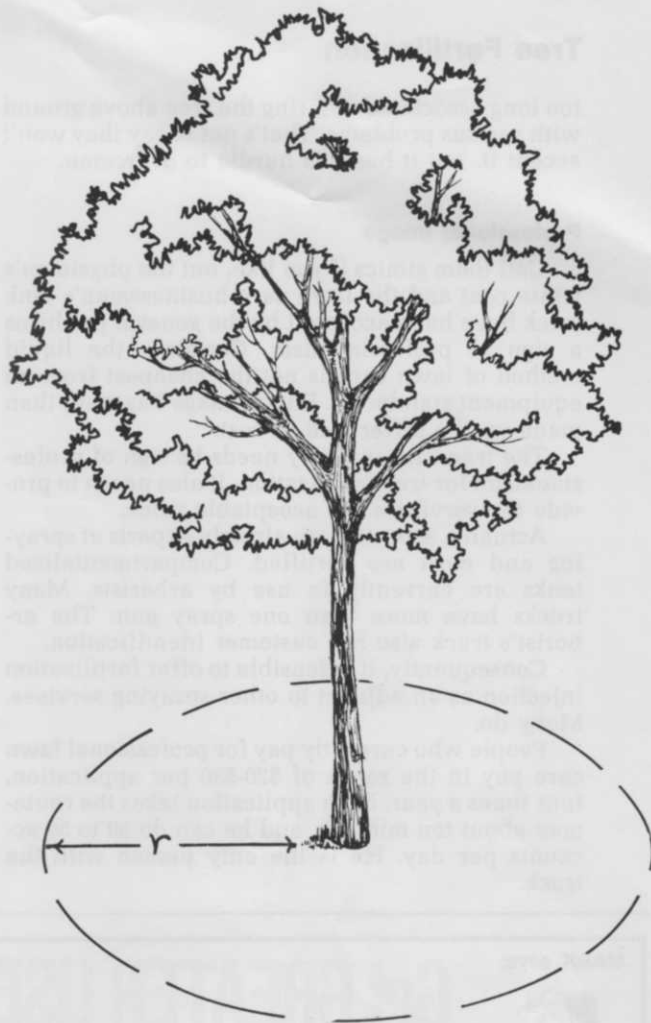


Table 1: Surface Area and Nitrogen Requirement According to Tree Size.

Radius*	Surface Area**	Nitrogen Needed	Lbs. N in Fertilizer	Lbs. Fertilizer Needed
3	28 sq. ft.	1/6	10	1 1/3
			12	1 3/4
			15	1 3/4
5	78	1/2	10	5
			12	4 1/6
			15	3 1/3
8	200	1 1/5	10	12
			12	10
			15	8
10	314	1 1/10	10	19
			12	15 3/4
			15	12 1/2
12	452	2 1/4	10	27 1/2
			12	22 3/4
			15	18 1/2
15	706	4 1/4	10	42 1/2
			12	35 1/4
			15	28
18	1,017	6	10	60
			12	49 1/2
			15	39 1/2

* distance from trunk to drip line.

** $r^2 \times 3.14$ (pi)

Tree Fertilization

too long associated entering the tree above ground with serious problems. That's not to say they won't accept it, but it has this hurdle to overcome.

Professional Image

Call them gimics if you like, but the physician's white coat and the lawn care businessman's tank truck have been accepted by the general public as a sign of professionalism. Certainly the liquid method of lawn care is not the cheapest from an equipment standpoint. But its image has more than made up the difference in cost.

The tree care industry needs its sign of professionalism for tree fertilization. It also needs to provide the service at an acceptable price.

Actually, arborists are already experts at spraying and most are certified. Compartmentalized tanks are currently in use by arborists. Many trucks have more than one spray gun. The arborist's truck also has customer identification.

Consequently, it is feasible to offer fertilization injection as an adjunct to other spraying services. Many do.

People who currently pay for professional lawn care pay in the range of \$20-\$30 per application, four times a year. Each application takes the route-man about ten minutes, and he can do 30 to 50 accounts per day. He is the only person with the truck.

But, for a route devoted just to tree fertilization, the standard arborist vehicle and crew would be impractical. It is doubtful whether a homeowner will pay more for tree care than lawn care (fertilization only). A second type of vehicle specifically for one of the methods of tree fertilization is needed.

Professional image is difficult to earn when the person is doing essentially the same thing that a customer can do himself. This includes spikes, surface application, to an extent vertical hole punching and foliar spraying. Foliar spraying has not done well in tests either.

The most unique method having the characteristics necessary for customer identification is the soil injection method. If this method could be developed into a route similar to lawn care, there may be great potential.

The vehicle must be unique and attractively marked, operated by one person, and efficiently routed. Promotion must be high quality. Route managers must be rewarded well for their efforts.

This type of large scale marketing may be too much for some firms, but lawn care has shown it can be done. Volume is the only way to keep prices down at an acceptable level.

There is a need for professional tree fertilization, but it hasn't yet been put into a form that customers will readily accept and then demand.
Bruce Shank

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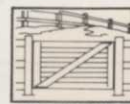


MINI says:

MAKE YOUR OWN LUMBER AND BUILD THESE



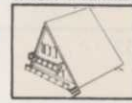
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GATES & FENCES



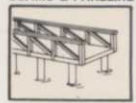
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WT&T
PROFILE

THE BUSINESS OF SOD PRODUCTION



PRINCETON SAYS: Our Tremendous Growth Continues

1978 has been the greatest year in our history. We at Princeton are both proud and grateful. Proud of our products... our growth... and our success. Grateful to you for your trust and your business. We are sod producers ourselves. Our

unique experience and technical skill enabled us to tackle and solve the age-old problems of inefficiency...excessive, costly down-time...inadequate production and soaring labor costs. We revolutionized tradition with innovation.



Proud of Our Growth

- **New plant expanded...additional 50%**

Our new plant and office complex, completed just one year ago, has recently been expanded an additional 50% to meet our increasing production requirements.

- **Production up...nearly 300%**

Over-all production of major equipment line increased a tremendous 289% over 1977.

- **Total Personnel up...over 400%**

Keeping up with your demand isn't easy... but we're trying. This year alone Princeton has increased its staff an unbelievable 427%.

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- 3 distinct models available
- Exclusive 2-minute hook-up capability
- Low price... high output
- 3 man crew (1 driver, 2 stackers)

The Princeton "Self-Propelled"

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- Unsurpassed manual production

The Princeton "Automatic"

- **The Ultimate**
- One man does it *all*
- Cuts, aerates, crosstie stacks & palletizes
- Save time, money and manhours

The E-2 Transplanter

- Save time, money & labor while planting. Later too! Can pay for itself — twice — in one season.
- From 2 in. pots to 8 ft. shade tree whips
- Perfectly spaced plants and rows for easier, more economical cultivation
- **Now available in 2 & 3 Row Models**



The Princeton "Tow-Boy"



The Princeton "Self-Propelled"



The Princeton "Automatic"



The E-2 Transplanter

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SOD PRODUCERS PLANT FEWER ACRES IN 1978

Approximately 1,200 companies grow \$225 million worth of sod each year according to a survey of 144 sod producers by Weeds Trees & Turf.

In the process, sod producers spend \$6.6 million for seed, \$15 million for fertilizer, and \$3.9 million on chemicals each year.

More than 700 U.S. sod producers were mailed questionnaires for this survey. Twenty percent returned them.

The universe of 1,200 sod companies was derived from input by the American Sod Producers Association and suppliers. Those considered actual sod farmers either have sod production as a primary source of revenue or farm a significant amount of sod acreage. Significant in this case would be more than 20 acres. Many nurseries grow a few acres of sod as a sideline to wholesale or retail business. For this survey, such nurseries were not included.

A value of \$1,500 per acre of sod produced was used to calculate gross revenue. This figure is a moderate estimate based upon data from Maryland (see article page 33). Value per acre has been reported as high as \$2,200 and as low as \$1,300.

The average sod farm is 290 acres from which 112 acres of sod was sold in 1977 at a value of \$168,000. Using median figures, the typical sod farm is 150 acres from which 70 acres was harvested in 1977 at a value of \$105,000. A few sod farms in the 800 to 1,500 acre range inflated the average. The average staff is six full-time and seven part-time employees.

According to these figures, sod growers harvest between a third and a half of their acreage annually. They expect to sell between 10 and 15 percent more acreage in 1978 than in 1977. However, respondents planted 15 percent less acreage in 1978. Perhaps this is in response to a predicted downturn in building starts.

Landscape contractors are the largest purchasers of sod, followed by homeowners and builders. Nearly two-thirds of sod growers sell to retail nurseries and 56 percent sell to wholesale nurseries. Athletic fields (58 percent) and golf courses (51 percent) are major buyers of sod.

Sod growers indicated that Tifway is the most common bermudagrass for sod, Penncross is the most common bentgrass, Pennlawn is the most common fescue, Manhattan is the most common ryegrass, Floratam is the most common St. Augustine grass, and Meyer Z-52 is the most common Zoysia.

Bluegrass, of course, is the dominant type of sod produced. Baron ranked number one with 47 percent of the growers. Merion still places strongly in second (27 percent), Fylk-

ing third (26 percent), Glade fourth (25 percent), and Adelphi fifth (23 percent). The Maryland article in this issue points out that most sod today contains mixes and blends of varieties. The amount of single variety sod grown has dropped dramatically in the last ten years.

The average sod grower spends approximately \$30,000 annually for seed, fertilizer and chemicals. Using the average acreage of 290, the average material cost per acre is \$103. The largest part of this cost is fertil-

Annual expenditures projected for 1,200 sod producers.

	%	Range	Median	Mean	Projection
Fertilizer	87	\$ 75-\$140,000	\$7,000	\$14,465	\$15,000,000
Fungicide	25	\$100-\$ 27,000	\$ 500	\$ 2,198	\$ 660,000
Herbicide	74	\$ 20-\$ 35,000	\$2,000	\$ 3,604	\$ 3,200,000
Seed	58	\$250-\$ 85,000	\$6,000	\$ 9,505	\$ 6,600,000

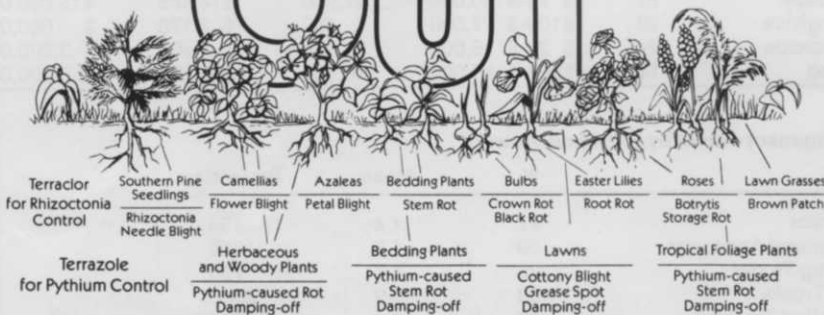
Equipment owned by 1,200 sod growers.

	%	Mean	Projection
Aerator	27	1.4	450
Chemical Applicator	69	1.5	1200
Dump Trucks	36	1.7	730
Lift Trucks	58	3.3	2300
Flat Bed Trucks	66	2.4	1900
Pickup Trucks	81	2.9	2800
Trailer Trucks	44	2.7	1400
Flail Mowers	49	1.4	820
Rotary Mowers	58%	1.6	1100
Reel Mowers	42	4.6	2300
Gang Mowers	64	4.6	3500
Fertilizer Applicators	71	1.8	1500
Small Utility Vehicles	21	2.0	500
Sod Cutters	71	2.3	2000
Self Contained Sod Harvesters	47	1.8	1000
Tractor Drawn Sod Harvesters	17	1.7	350
1-25 h.p. Tractors	33	1.7	670
26-50 h.p. Tractors	79	3.5	3300
51-100 h.p. Tractors	57	2.4	1600
100+ h.p. Tractors	22	1.9	500

Projected totals of acreage of sod farms.

	Projected to 1,200 farms
Total Acreage	349,000
Acres Planted in 1978	128,000
Acres Harvested in 1978	150,000
Acres Sold in 1977	135,000

AW, CUT IT OUT



For more information on how to cut out fungi diseases in turf and ornamentals.

Your turf and ornamentals need moisture to survive. However, wet weather brings out the worst in your soil. Fungi diseases like damping-off, blight and rot. Diseases that can stunt or weaken your plants.

Terraclor® and Terrazole® soil fungicides protect the value and beauty of your turf and ornamentals. Give you healthier, stronger plants, that are more beautiful.

Get Terraclor or Terrazole from your local chemical supplier. For more information cut out and mail the coupon.

Terraclor, Agricultural Department Olin
P. O. Box 991, Little Rock, Arkansas 72203

Name _____

Address _____

City _____

State _____ Zip _____

Please send information on turf and ornamental disease control.

Caution: Read and follow label directions carefully.

Terraclor®
soil fungicide



Circle 110 on free information card

Survey

izer (\$50), followed by seed (\$33) and then herbicides (\$12). An average of \$7.50 per acre is spent for fungicides.

The 1,200 sod producers own 3,350 harvesters and cutters, 6,070 tractors, 7,720 mowers, 2,300 lift vehicles, 2,800 pickup trucks, 1,900 flat-bed trucks, 1,500 fertilizer spreaders, 1,200 spray rigs, 1,400 trailer trucks, and 450 aerators. A conservative value of equipment inventory of the average sod producer is \$250,000. **WTT**

Types of seed used for sod and number of respondents indicating use.

BERMUDA 19%

Tifway 419 or 328	22
Santa Ana	3
PD 102	2
Tiff Green	4
Midiron	2
Coastal	1
Common	2

BENT 3%

S71	1
Penncross	3
Seaside	1
Toronto C-15	1

BLUEGRASSES 67%

Baron	47
Merion	27
Glade	25
Fylking	26
Adelphi	23
Victa	15
Park	10
Windsor	6
Newport	8
Touchdown	7
Majestic	12
Pennstar	5
Others	33
Blends	34

FESCUE 15%

Pennlawn	5
Jamestown	2
K 31	4
Creeping Red	3

RYEGRASS 6%

Manhattan	4
Citation	1
Pennfine	2

ST. AUGUSTINE 10%

Floratom	8
Bitter Blue	4
Living Carpet	1
Blue-Green	1
Common Texas	1

ZOYSIA 12%

Emerald	11
Meyer Z-52	15
Metrella	2

ARGENTINE BAHIA 2%

CENTIPEDE 12%