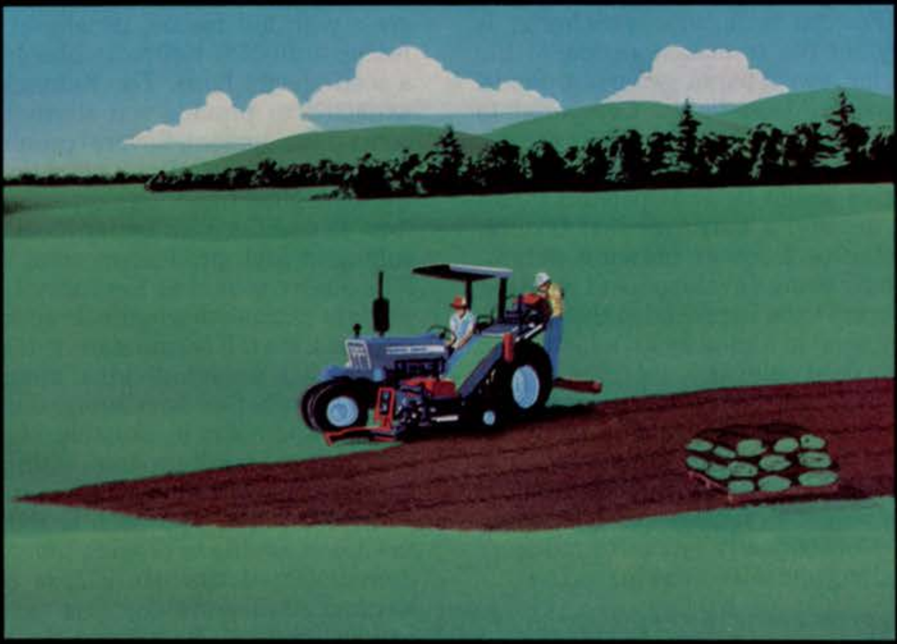
Touchdown
Kentucky Bluegrass



Sod growers specify Touchdown for profit

Rapid development of marketable turf is the key to profitable sod production. That's why sod growers prefer Touchdown.

An aggressive turf that fills in quickly, crowds out weeds and undesirable grasses, even under low mowing heights, Touchdown is a must in any turf program. Touchdown's strong and vigorous rhizome system means tough turf and quick healing from traffic and machine damage. Whether you seed or sod, specify Touchdown.

Touchdown
KENTUCKY BLUEGRASS

Pickseed also produces AMERICA KENTUCKY BLUEGRASS and Fiesta PERENNIAL RYEGRASS

Produced by
PICKSEED
PICKSEED WEST Inc.
P.O. Box 888, Tangent, OR 97389 • (503) 926-8886
Distributed in Canada by Otto Pick and Sons Seeds Ltd.
Box 126, Richmond Hill, Ontario • (416) 884-1147

NETTING, TALL FESCUE TEAM UP TO PRODUCE NINE-MONTH SOD

By R.N. Carrow, L. Leuthold, and R.W. Campbell, Department of Horticulture, Kansas State University, Manhattan, Kansas

Tall fescue (*Festuca arundinacea* Schreb.) is widely utilized in the transition region of the United States for lawns, parks, general grounds, and high school athletic fields. Compared to Kentucky bluegrass, tall fescue exhibits greater drought and high temperature tolerances. Wider use of tall fescue would be anticipated if it had greater shoot density, a narrower leaf texture, and could tolerate a lower mowing height. Cultivars are now being developed and released which are reported to be improved in these characteristics compared to Kentucky 31, which is the most commonly used cultivar.

Establishment of tall fescue has been almost entirely by seeding. Sodding would be an attractive alternative. However, tall fescue does not produce the long, interwoven rhizomes which provide sod strength necessary for harvesting and handling. Consequently few sod producers have attempted to grow tall fescue for sod.

Alternative Approaches

Some growers have seeded Kentucky Bluegrass with tall fescue, usually at a 75-90% tall fescue to 10-25% Kentucky bluegrass mixture on a seed weight basis. The Kentucky bluegrass is expected to provide sod strength through rhizome development. Several problems may occur with this approach. Production time to develop a sod with good handling properties is often more than 18 months even under ideal conditions, resulting in high production costs. Another problem observed is that Kentucky bluegrass often tends to become the dominate species. When this happens, the tall fescue starts to take on a bunchy appearance since individual clumps develop. If this occurs before harvesting, the sod quality is inferior and not as marketable. However, even if the clumping is not apparent at time of harvesting it often appears within a year of transplanting.

Harvestable in nine months, the fescue and netting combination exhibited tensile strength five to six times greater than tall fescue sod without netting.

An alternative approach to sod production is the use of netting to provide sod strength. Beard[1] demonstrated the usefulness of netting for Kentucky bluegrass and this technique is now widely accepted. With Kentucky bluegrass, production time is greatly reduced since harvesting can be done as soon as shoot quality is adequate.

Recently, Burns[2] and Carrow and Sills[3] demonstrated that tall fescue sod production by this technique is feasible. Carrow and Sills[3] used VEXAR Garden Utility Net (E.I. duPont de Nemours and Co.) with a 2 x 2 cm mesh laid on the soil surface. Tall fescue was seeded at 4 lbs. seed per 1000 sq. ft. in both fall (Table 1) and spring (Table 2) seeded studies. The fall seeded tall fescue exhibited sufficient quality to harvest by 9 months (May), while the spring seeded area was ready for cutting in 4.5 months (August). In both studies, visual quality was somewhat better for plots containing netting. This response may have been due to seed washing during heavy rains which occurred in the no-net plots.

Sod tensile strength was 5 to 6 times greater for the fescue sod containing netting. Without netting, tall fescue sod was difficult to handle; with netting, its handling properties were excellent.

Transplant sod quality data refers to the visual quality of the turf at one month after transplanting. Netted plots exhibited somewhat better quality, probably due to a better quality at the time of harvesting. Transplant sod rooting indicates the ability of tall fescue to reroot after harvesting and transplanting. No differences were observed between netted and no-net plots which would indicate that the netting does not interfere with rooting after transplanting.

In a third investigation, seeding rate, nitrogen rate, and time of nitrogen application were studied (Table 3). The 8 lb. seed per 1000 sq. ft. rate resulted in better quality turf due to higher shoot density and uniformity. Also, sod tensile strength was improved. However, quality and sod tensile strengths were acceptable at the 4 lb. seeding level.

By May 1, individual plants were noted to be smaller and less vigorous at the 8 lb. seeding rate. Increased competition between plants may account for the higher incidence of *Helminthosporium* leaf spot. At the 8 lb. seeding rate, the

Continues on page 35

Table 1. Fall seeded (Aug. 30, 1977) netting study on tall fescue.

Netting treatment	Quality rating[z] Weeks after seeding 7	10	37	41	Sod tensile strength[y] (lb)	Transplant sod quality rating[z]	Transplant sod rooting[x] (lb)
Net	6.8	6.8	7.3	7.8	68	5.7	119
No Net	6.3	6.2	6.4	7.5	13	5.0	107
LSD (5%) =	0.4	0.4	0.4	0.3	6	0.6	NS

[z]Visual quality rating: 9 = ideal, 1 = no live turf.
[y]Force necessary to break a 12 inch wide strip of sod.
[x]Force necessary to separate an 11 x 11 inch sod piece from the soil by vertical lifting.

Table 2. Spring seeded (March 29, 1978) netting study on tall fescue.

Netting treatment	Quality rating[z] Weeks after seeding 10	13	19	Sod tensile strength[y] (lb)	Transplant sod rooting[x] (lb)
Net	7.0	7.2	7.4	67	95
No Net	6.5	6.5	6.9	11	90
LSD (5%) =	0.5	0.5	NS	3	NS

[z]Visual quality rating: 9 = ideal, 1 = no live turf.
[y]Force necessary to break a 12 inch wide strip of sod.
[x]Force necessary to separate an 11 x 11 inch sod piece from the soil by vertical lifting.

Table 3. Effects of seeding rate, nitrogen rate, and nitrogen application date on fall seeded (Aug. 29, 1978) tall fescue using netting.

Treatment	Quality rating[y], 1979 Apr 4	May 1	June 7	July 3	Leaf[x] spot rating May 9	Turf cover (%)	Sod tensile strength (lb)
Seeding rate (lb/1000 ft²)							
4	5.0	5.7	6.7	7.4	1.6	87	91
8	6.6	6.1	7.1	7.6	2.2	93	106
N rate (lb/100 ft²)							
1.5	5.8	5.8	6.6	7.4	2.0	88	97
3.0	5.8	6.0	7.2	7.6	1.9	91	101
Application date[z]							
Sept, Oct	5.4	5.5	6.7	7.3	1.8	88	94
Sept, Nov	6.0	6.0	6.7	7.5	2.4	88	104
Sept, Mar	6.5	5.7	6.7	7.5	2.0	88	91
Sept, Apr	6.5	6.3	7.5	7.6	1.5	95	106
LSD (5%) (seed rate) =	0.9	0.8	NS	NS	0.5	5.6	4
(N — rate) =	NS	NS	NS	NS	NS	NS	NS
(App. time) =	NS	0.6	NS	NS	NS	NS	NS
Interactions were not significant.							

[z] Nitrogen application was split equally between dates.
[y] Visual quality rating: 9 = ideal, 1 = no live turf.
[x] *Helminthosporium* spp. leaf spot scale: 0 = none, 2 = moderate, 5 = severe, with 75% or more leaves with lesions.
[w] Sod tensile strength taken on July 11. Force necessary to separate a 28 x 28 cm sod piece from the soil by vertical lifting.

turf was very dense and tended to lift the netting from the soil. These factors would suggest that a seeding rate of about 6 lb. seed per 1000 sq. ft. and a coarser mesh netting may be beneficial for tall fescue sod production.

Nitrogen rate did not significantly influence any of the factors measured. The application program of September-April tended to exhibit the best visual quality. This would suggest that for a fall seeded tall fescue, nitrogen in the spring should be considered, especially if the sod is to be harvested in late spring.

Possible Production Problems

Since most sod producers are not familiar with tall fescue sod production, they should consider the possible problems that may occur. In the previous section we alluded to potential problems; (a) high seeding rates may result in excessive competition, (b) a dense stand may lift the netting if it is not buried or is too fine of mesh.

Equipment is commercially available to bury netting during the seeding operation. Burying should be considered, particularly in windy sites which are common in the Central Plains. High winds may lift the netting if it is not covered with 1/8 - 1/2 inch soil. The equipment should be tried out on each particular site, especially if the soil is high in clay and tends to develop clumps. Burying the netting can be difficult with such soil conditions.

Whenever netting is buried, the grower faces a problem if the crop fails. Removal of the netting is very difficult prior to working the soil for reestablishment. Disking several directions followed by deep plowing will often place it deep enough for reestablishment. However, deep cultivation should be avoided in the future.

Another factor which should be considered is the cutting depth for tall fescue sod. The crown of tall fescue is quite large compared to Kentucky bluegrass. Sod cutting depth must be below the lower crown region since cutting the crown will prevent root establishment. Also, cutting depth must be sufficient to be below the netting. In general, tall fescue will require a somewhat deeper cutting depth compared to Kentucky bluegrass.

Tall fescue is not as low temperature tolerant as Kentucky bluegrass and hence a greater possibility of low temperature kill exists. Normally, a tall fescue, which has sufficient time to become winter hardy will not be injured. Sod growers should avoid late fall seedings, excessive nitrogen fertilization, and over-irrigation on fall seeded stands.

In the Central Plains region, *Helminthosporium* leaf spot injury has periodically been observed on tall fescue. This is normally not a problem on mature plants but may occur in the late fall and spring periods and newly seeded sites. Avoiding high seeding rates and excessive nitrogen will minimize this problem.

Growers must adjust their mowing program to tall fescue. The late spring period is especially important. During this time, tall fescue produces a seed head which grows very rapidly. Care must be taken to maintain an adequate mowing frequency. Research is presently underway at Kansas State University to explore the possibility for utilizing growth regulators on tall fescue during the spring period to reduce seed head production and mowing frequency.

Beard[1] noted that weed control is very important when using netting. Since sod production time is greatly reduced with netting, weeds must be eliminated or prevented by the proper use of herbicides. Preemergence annual grass control and broadleaf weed suppression in the young tall fescue stands would be of primary concern. If weeds are allowed to develop, the sod must be held longer in order for the openings to fill in. This is especially important on a bunch-type turf, such as tall fescue, since it does not have rhizomes or stolons to quickly fill in open spots.

> Slower sod transplant rate is likely with tall fescue.

When transplanting a tall fescue sod, care should be taken to insure good transplant rooting. Since tall fescue does not have long rhizomes, root growth must be primarily from root initiation at the crown. This fact, in conjunction with a deeper cut sod, can result in a slower sod transplant establishment rate compared to Kentucky bluegrass.

While there are several potential production problems, these can be overcome with proper management. With the introduction of improved tall fescue cultivars, the potential for much greater utilization is present. Growers may wish to explore this market. **WTT**

References

1. Beard, J.B., D.P. Martin, and F.B. Mercer, 1980. Investigation of net-sod production as a new technique. *In* Proceedings of the Third International Turfgrass Research Conference. Amer. Soc. of Agron. Pub. Pages 353-360.
2. Burns, R.E., 1980. Techniques for rapid sod production. *In* Proceedings of the Third International Turfgrass Research Conference. Amer. So. of Agron. Pub. Pages 361-366.
3. Carrow, R.N. and M. Sills, 1980. Tall fescue sod production with plastic netting. Hort science 15 (6):
4. Hall, J.R., 1980. Effect of cultural factors on tall fescue — Kentucky bluegrass sod quality and botanical composition. *In* Proceedings of the Third International Turfgrass Research Conference. Amer. Soc. of Agron. Pub. Pages 367-377.
5. Juska, F.V., A.A. Hanson, and A.W. Hovin, 1969. Evaluation of tall fescue, *Festuca arundinacea* Schreb., for turf in the transition zone of the United States. Agron. J. 61: 625-628.

MODERN ENGINES ARE GEARED FOR LONG WEAR AND FUEL EFFICIENCY

By Ruth E. Messinger, Contributing Editor

As the longevity of tree and lawn care equipment becomes an economic necessity to Green Industry businessmen, engine quality assumes major importance. Not only reliability, but durability, ease of maintenance, fuel costs, and availability of replacement parts are factors to weigh carefully before making an initial investment.

The demand for diesel engines, with their lower fuel consumption, has been growing recently. Some gasoline engine manufacturers have added diesel engines to their regular lines.

"Diesel is the way to go in the future," says Ken Lorch of Onan Corporation. "Diesel engines last longer, they are easier to maintain, and they do heavy duty and maintain better fuel economy."

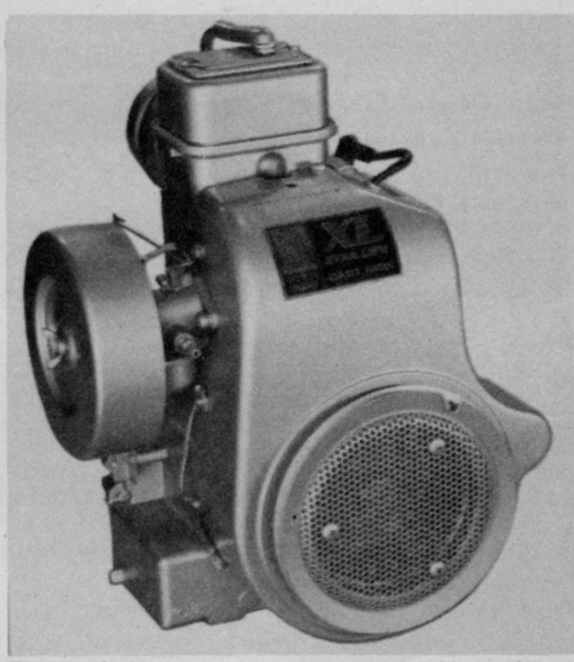
"Fuel in diesel consumption is one-half that of gasoline," says Orville McDonner, vice president of research and development of Bunton & Goodall. The company uses a Teledyne Wisconsin diesel engine on one of its tractors. "Diesel has a longer life span than gasoline, requires less maintenance."

Kohler Company's John Clark, vice president of engineering, Gravely Division, disagrees. "The smaller diesel engines really require more care and maintenance than gasoline engines and are not as forgiving of dirt," he says. "We see a demand for diesel, but we have not taken much action yet. We were thinking of it for Europe, but recently the demand for it disappeared there, because the price of diesel caught up with the price of gasoline. A number of big commercial operators with big tractors demand diesel on smaller machines so they don't have to handle two kinds of fuel. We may consider it in the future."

"For every forty-two gallon barrels of oil that are taken from the ground," says Briggs & Stratton's Executive Vice President, L. W. Dewey, "thirteen are made into gasoline and eight into diesel fuel. When more diesel goes on the market, it will cost just as much as gasoline." Briggs & Stratton is developing a diesel engine which it expects to introduce in two or three years.

Manufacturers of both gasoline and diesel models are assuring long engine life with rugged construction, protection for tough wear areas, and fewer major moving parts.

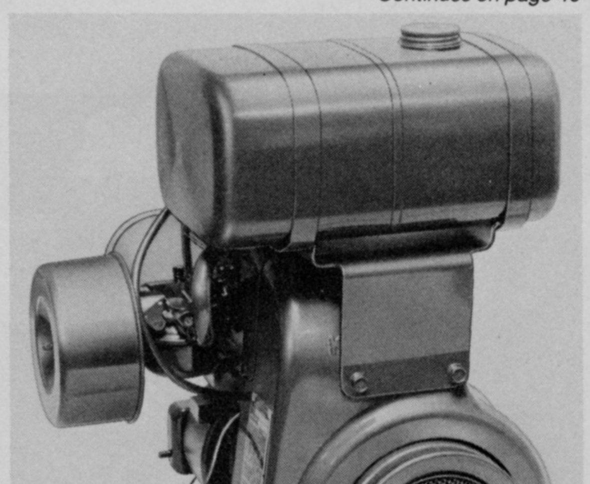
Among the new gasoline engines is Tecumseh's (301) 1000-hour, four-horsepower engine for heavy-duty rotary mowers. Its cast-iron cylinder liner lengthens cylinder life. The cast-iron bore is made to show less wear and retain better oil control. And the Stellite-faced exhaust valve and seat provide good sealing for extended service. Like other models in the TVS system, it features rustproof fuel tanks with integral-filter screen.



Tecumseh OH four-cycle engines are available in 12 to 18 horsepower.

Tecumseh also offers a line of snow-throwing engines, from two-cycle models for lightweight equipment through big power models for larger, two-state drift busters with 7, 8, and 10 horsepower.

Continues on page 40



Kohler 141 six-horsepower, four-cycle engine.

Kohler (302) has added a trio of two-cylinder gasoline engines with 17, 19, and 21 horsepower suitable for lawn and garden equipment. The heavy-duty, air-cooled engines have rugged cast-iron components. All are four-cycle models, and many parts are interchangeable in the series.

Each engine has an opposed cylinder design with cast-iron cylinder barrels. The crankshaft on the 17-horsepower model is made of ductile iron, and the others are of forged steel. Each engine also has an automotive-type oil pump, a replaceable dry-type air cleaner, and high carbon steel intake valves.

"We've styled these engines for easy servicing," says J. O. Kohl, director of customer service. "The cylinder barrels are removable and breaker points, condenser, spark plugs, and dipstick are all on top of the engine for easy access."

The entire Kohler line includes one- and two-cylinder models ranging from 4 to 23 horsepower. "We are going into the twin cylinder engine in the 16 horsepower and above," says John Clark.

Briggs & Stratton (303) engines for lawn and garden care include 3-, 3½-, 4-, and 5-horsepower lawnmower models. They are available

Briggs & Stratton five-horsepower, four-cycle engine.

with an automatic compression release Easy Spin starter or an optional ignition key type, 12-volt electric starter with rechargeable battery pack. An automatic choke provides metered fuel to meet any load without priming or manual adjustments.

This company also offers four-cycle tiller engines of 16 and 18 horsepower that eliminate fuel-line breakage or clogging through carburetor/fuel tank integration. The air cleaner is located away from heavy dust and dirt areas.

Briggs & Stratton's drift busters, the two- and four-cycle Sno/Gard engines, feature ultra-high torque and are available with 3 to 11 horsepower. The 3-horsepower 102 cc two-cycle model has a 6.2 cubic-inch displacement for lightweight portability and power. The four-cycle is available with 4, 5, 7, 8, or 11 horsepower. All are weather-shielded to block snow and moisture from cooling air intake, carburetor and governor, starter clutch, and spark plugs. Their ceramic magneto ignition produces high voltage at starting speeds.

Twin engines in 16 and 18 horsepower are designed to handle rugged jobs with smoothness. Cast-iron sleeves and ball bearings are standard on the 18-horsepower horizontal crankshaft engine and optional on the 16-horsepower horizontal crankshaft model.

Kawasaki's (304) four-cycle, air-cooled gasoline engines have a range from 3.4 to 20 horsepower. Model KF53DS with a 4.7 horse-

Kawasaki 6.4-horsepower, four-cycle KF 64 engine.

power has a bore of 2.59 inches (66 mm) and a stroke of 2.09 inches (53 mm). The 20-horsepower Model KF200DS has a bore and stroke of 85 x 70 mm (3.35 x 2.76 inches) and lubrication is force-fed by trochoid pump.

Onan (305) manufactures one-, two-, and four-cylinder air- and water-cooled gasoline engines with 12.9 to 25 horsepower and a line of heavy-duty, air- and water-cooled diesel-powered engines with 7.2 to 40 horsepower.

The two-cylinder B Series gasoline engines, which operate best between 2600 and 3600 rpm, are for use where light weight and low noise are needed. Their crankcases are made of die-cast aluminum to minimize heat build-up around the exhaust valve seats and cylinder bores. The crankshafts are of ductile iron with hardened journals.