



## The Search For Shade Tolerant Turf



**S**HADE from trees can often become a problem in good turf management. Even though trees are a very necessary and desirable part of our ecological balance, they can cause some rather perplexing problems in turf management.

Most difficulties develop when grass plants under or near trees do not receive enough full sunlight to carry on adequate photosynthesis. Consequently, shaded turf often deteriorates, thins out and becomes unsightly and patchy.

In some instances, less than 5% of available sunlight is able to penetrate a canopy of trees. However, turf failure under trees is not always due to a reduction in light intensity. A deleterious shift also occurs in the spectral composition of light. Tree leaves filter out much of the blue and red portions of the spectrum—the segment most efficiently utilized by grass plants. This causes a reduction in photosynthesis and diminishes the ability of the plant to manufacture carbohydrates required to maintain normal growth. Leaves become smaller, less prolific and more succulent. Color fades due to the reduction in chlorophyll. Plants lose their ability to develop new tissue and do not spread and fill in open areas.

In fact, the entire micro-climate under trees is considerably altered. Dew remains on grass leaves longer and humidity is increased. These conditions, plus the softer growth of the leaves, provides an ideal climate for diseases to attack the grass plants. In addition, many roots of large trees can rob grass plants of valuable moisture.

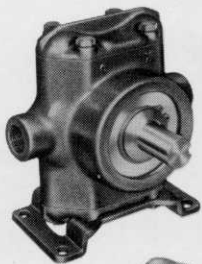
Certain management steps can be taken which help maintain turf-grasses under trees. Regular pruning of tree limbs allows more direct sunlight to penetrate through and reach the soil. Additional fertilization and water will make it easier for grass to survive. Stagnant air at ground level will allow turf diseases to thrive. Therefore, any plants or shrubs that restrict adequate ventilation should be removed or pruned. Aerification of the soil will aid the plant in absorbing nutrients more easily and mowing the grass at a 2-inch to 3-inch height

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Above: Shade trials were conducted under this canopy of trees. Sod plugs were transplanted throughout the middle of the area. Left: This is Nugget. Note that it has thinned, but the stand is still good. Leaves have elongated somewhat over their appearance in full sunlight. Color is dark green.

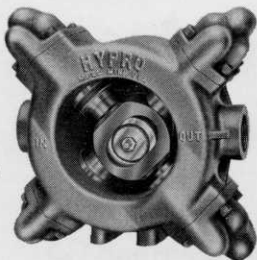
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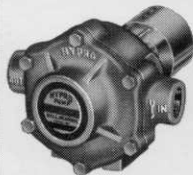
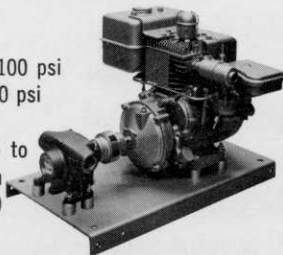
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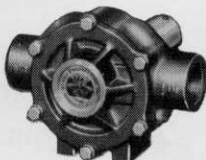


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## **SEARCH (from page 19)**

will allow more leaf surface for the production of carbohydrates.

Red or Chewings Fescue are generally used to maintain turf under trees. *Poa trivialis* can be used with some success but is better adapted to moist conditions, such as the north side of buildings. Kentucky Bluegrass varieties are generally not considered to be tolerant to even moderate shade conditions.

When fescues are used in combination with bluegrasses to establish turf in shade, each kind of grass tends to dominate where conditions are best for its survival growth. Fine fescues will become dominant under dry, shady conditions; *Poa trivialis* where moist shade is predominant and Kentucky Bluegrasses where sunlight is not limited.

The problem to be faced then is the segregation of plant type and the lack of gradual transition from shade to sun. The thin, wire-like blades of fine fescues and the relatively wide blades of Kentucky Bluegrass most often cause very distinct and abrupt transitions from sun to full shade, a quality not altogether desirable.

The need for sod-forming grasses adapted to shady conditions has long been recognized by companies such as Northrup, King & Co. A portion of their breeding and evaluation program on turfgrasses is directed toward reaching this objective. New varieties are screened for shade tolerance. Those that pass initial screenings are further tested.

Howard Kaerwer, chief turf agronomist at Northrup King, realizes the differences in light quality which occur under trees and other forms of shade. He recently tested new and established varieties in a series of three tests: turf trials in full sunlight, under a Saran shade screen and under a natural tree canopy. The agronomist currently has over 500 different grasses planted under natural shade conditions at Northrup King's trial grounds in Eden Prairie, Minn.

To establish grasses under these test conditions, four-inch plugs of mature sod, grown in full sunlight, were transplanted early last spring before established trees had a chance to leaf out. In this way, the turf candidates could take advantage of enough sunlight to become well established before the much denser shade followed. Fertilizer was used moderately and the plots were watered only when required. Each plot was kept ap-

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## SEARCH (from page 36)

proximately two inches in height and moved about every two weeks. At leaf fall in September, most of the entries under natural tree canopy were dead or severely thin.

A few experimental Kentucky Bluegrasses—the object of the trials—and several experimental fine fescue varieties were identified as being more tolerant to shade than varieties presently on the market. They provide the real hope for a

turf that will be even-textured from full sunlight to shade.

One of the most outstanding finds was Nugget Kentucky Bluegrass, which is ready for commercial sale this year. Nugget has shown high resistance to leaf spot (*Helminthosporium* Spp.) diseases and powdery mildew. Due to the severe conditions of the trial, Nugget plants became more upright and the sod more open, but the stand was maintained to provide reasonably good grass cover.

All other Kentucky Bluegrass varieties presently available were unsatisfactory. Here are the results. Golfrood, Highlight and Ruby Creeping Red Fescue were the only named varieties which were satisfactory. Pennlawn was killed completely. Ranier thinned severely as did Jamestown and a number of lesser well-known fescue varieties. Illahee Creeping Red Fescue was a poor fourth but did produce a reasonably satisfactory turf.

In addition to this specific shade tolerance study, the company has also conducted extensive turf trials at the Eden Prairie location. Over 1800 different plots are monitored. These plots are grown under full sunlight and are mowed at three different mowing heights. Fertility and moisture levels are also varied. When superior varieties are identified, sod from these grasses is lifted and transplanted to both the screened and natural shaded areas for further evaluations.

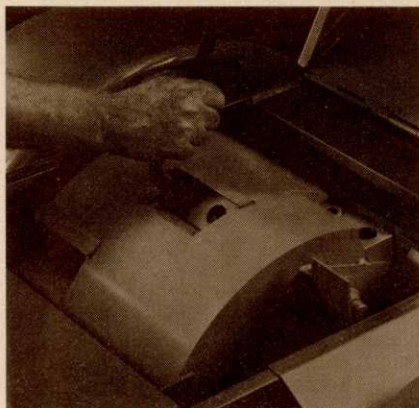
Northrup, King & Co. is hopeful that through this research varieties can be found that will overcome many of the problems involved in managing turf under shade conditions.

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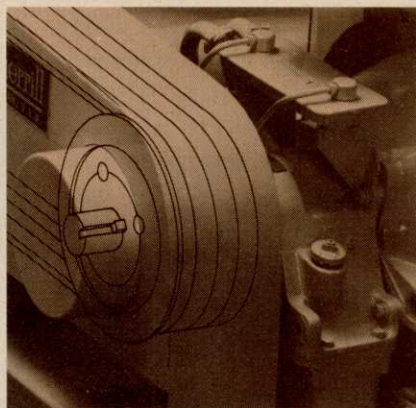
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## Maryland Herbicide

### Studies Are Reported

Fair to good results with chemical control of major weed pests in special situations in southern Maryland and the Eastern Shore were reported at the twenty-sixth annual meeting of the Northeastern Weed Science Society in New York City.

Dr. James V. Parochetti, assistant professor of agronomy at the University of Maryland, presented a paper on his two-year study of herbicides applied to Johnsongrass in noncropland areas.

The Johnsongrass studies were conducted in Charles and Somerset counties. Ten treatments involving formulations of sodium chlorate, Hyvar X, Dowpon, Tandex and MSMA were tested.

Best control of Johnsongrass resulted from applications of herbicides containing sodium chlorate. Carryover residual control in the following year was also good. Hyvar X and Tandex were effective against established Johnsongrass stands when applied early in the season.