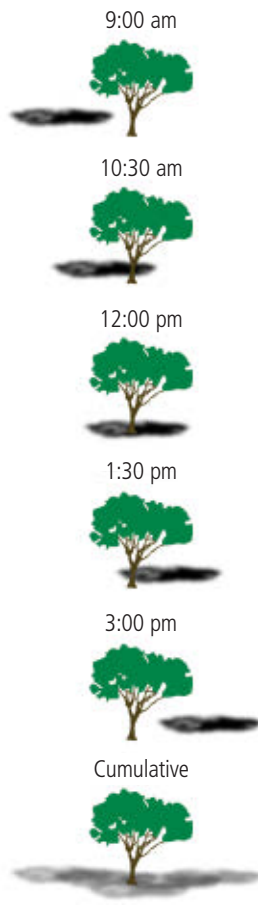scientific proof of the accuracy of light measurements under an overcast sky, see Campbell and Marini, 1992.)

A large surface of medium color such as a piece of cardboard is a reference target. The cardboard is placed on the ground under the tree and a camera reading is taken, then the cardboard is moved to the open area away from the tree, and a second reading taken.

Although most of us use a camera on fully automatic setting, a good camera has a manual setting which provides a readout of the aperture or exposure time or deviation (in F-stops) from ideal exposure. Since F-stops measure light in powers of 2 x (or 0.5 x), an area under a tree with 1 F-stop difference from full sun has 50% relative light, while 2 F-stops represents 25% relative light. If the readout is in exposure steps (e.g., 1/15 or 1/30 seconds) or in aperture stops (e.g., 4.0, 5.6) these are also powers of 2.

Testing in the shade

Scientists standardize shade level, under fabrics of known percentage transmission, to compare turfgrasses growing side-by-side in shade.

Neutral fabrics, such as black shade cloth, filter sunlight uniformly across the entire sky, without the problems of sun flecks or sun angle. Neutral shade is not perfect in representing the quality of light, the proportion of photosynthetic photon flux density largely in the red wavelengths, but it provides a reasonably accurate way of forcing relative shade levels of known percentages.

Few shade tolerance studies have been done of St. Augustinegrass varieties, and they generally use more light than is the problem.

To detect differences in shade tolerance among St. Augustinegrass varieties, shade tolerance studies should be conducted in the range of 10-20% light, not 25-45%, as has been the case.

SIDE VIEW
(tree + shadow)

9:00 am

10:30 am

12:00 pm

1:30 pm

3:00 pm

Cumulative

Getting shade grass

The last problem in the use of shade tolerant St. Augustinegrasses is where to obtain them. If they are not readily available, contact information for sod producers who grow shade tolerant St. Augustingrass varieties can be obtained from statewide listings such as **www.floridasodgrowers.com**. You can then call the grower and ask for the names of landscapers and installers they deal with.

Even with the overcast sky method of shade measurement, remember common sense; trees with touching canopies, or trees with a canopy touching a building are serious problems. So are dense shade species such as live oak, citrus, and Cuban laurel fig under which usually no turfgrass will survive.

As shown in the initial question, appropriate pruning may help temporarily. Deciduous trees such as cypress and gumbo limbo, and trees with filtered shade such as slash pine, may allow turfgrass to survive.

In summary, to deal with the problems of shade, the first step is determining the shade level, then be reasonable and don't expect miracles. Why we have not made more progress with shade tolerant St. Augustinegrasses, besides the difficulty of measuring shade, is the fact that university shade tests are not shady enough.

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