

Spectral Transmission of Greenhouse Glass K.L. Goldsberry

Glass, according to Morey (1) is superior to other competitors because of its ability to withstand corrosion, especially when the glass is produced for specific purposes. Many glass houses throughout the nation are still glazed with glass 40 to 50 years old. Some of this old glass is 1/4" thick and some is of the standard thickness. Chemically this older glass has withstood the test of time.

Many growers feel that glass loses its ability to transmit proper wavelengths and plant growth is harmed as the glass ages. Preliminary studies in the fall of 1966 were conducted to determine the spectral transmission of greenhouse glass of different ages.

Methods and Materials

Panes of glass of 1/4" and standard thickness approximately 43 years old were removed from greenhouses in Des Moines, Iowa. Panes of standard thickness and approximately 12 years old were also obtained for aging studies. The old panes were washed thoroughly with a detergent and muriatic acid. New unused greenhouse glass served for comparison.

The percentage of spectral transmission of the glass panes were compared to unobstructed solar radiation when the sun was at maximum altitude. The spectral transmission qualities were measured in Ames, Iowa, with a model SR and SRR Spectroradiometer made by ISCO of Lincoln, Nebraska.

Results

Figure 1 shows the spectral distribution and intensity curves of unobstructed solar radiation and new greenhouse glass. Equipment limitations allowed only the measurement of wavelengths between 380 and 1050 millimicrons.

The percent transmission of 4 types of glass as compared to unobstructed solar radiation is shown in Figure 2. For all practical purposes there is little difference between wave lengths transmitted by the glasses from 400 to 700 μ . From 700 to 1050 μ the differences are somewhat greater, but probably of little significance.

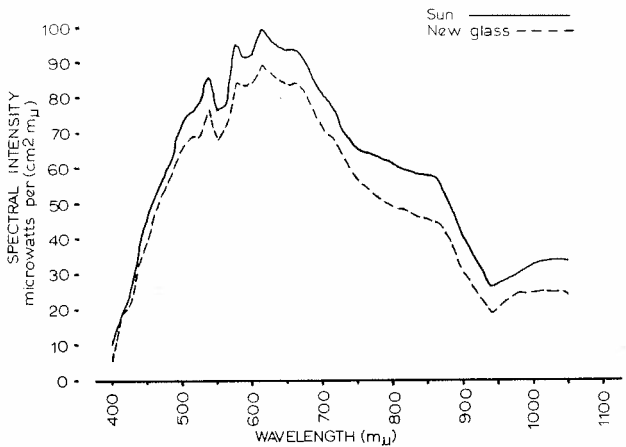


Fig. 1. Spectral distribution and intensity of unobstructed solar radiation and new greenhouse glass. Aug. 11, 1966, Ames, Iowa.

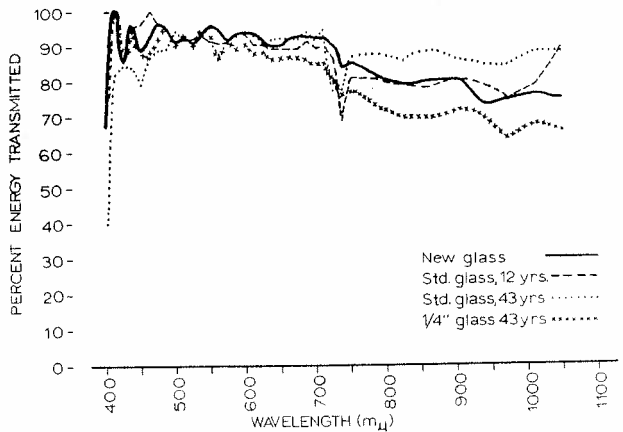


Fig. 2. The percent of unobstructed solar energy transmitted by panes of new standard greenhouse glass, standard glasses approximately 12 and 43 years old and 1/4'' glass approximately 43 years old. Aug. 11, 1966. Ames, Iowa.

Discussion

Within the range of 380 to 1050 μ , preliminary studies indicate that age of greenhouse glass has little effect on its spectral transmission. A slight scum that had accumulated on the older glass was not

removed and may have contributed to some of the differences in transmission.

Even though greenhouse glass may become "brittle" with age, if a concentrated effort is made to keep the glass clean, good spectral transmission can be expected.

The decrease in light available for plant growth is probably due mainly to dirty bars caused by paint loss, algae formation and dirt accumulation. Thus a preventative maintenance program involving washing glass and painting structures will provide good light for plant growth even with aging glass.

Literature Cited

1. Morey, George W. 1960. The Properties of Glass. American Chemical Society Monograph Series. Reinhold Publishing Corp., N.Y.