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Preliminary experiment on photoregulation of turfgrass

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Key words : photoperiod, light quality, environmental light signals, physiology, photoreceptor

With many experiments in plants under different lighting environment, people have realized that a whole refined and complicated system of light receptor and conductor exist in plants. There are many related research reports. In this, we make a review of turfgrass physiology under photoregulation and relationship with light photoreception.

Regulation of photoperiods Shape and growth of turfgrass could appear plastic variety with environment light periodic change. Periodic light treatment on turfgrass shows that: 14h treatment increased significantly in weight, root shoot ratio, density, coverage, height, plants fiber content improved 3% ~ 9%, PEPC enzymatic activity increase 64% ~ 88%, and soluble sugar content increase 12% ~ 23%. Turfgrass is sensitive to day length and it affects its geographic distribution and flowering time. For example, *Zoysia sinica* which flowers in November in the north would not flowering until February and flowering time is less than a month. Periodical prolong environmental day length could change dormancy mechanism of turfgrass in winter. Research shows that, in natural winter, turfgrass turned yellow, grew slower, and ABA content increased; with artificial treatment of periodical prolong environmental day length, ABA content is decreased, growth is improved and turfgrass maintained green a whole winter.

Light quality Selective absorption is a characteristic of plant response to light. Different light quality can improve photosynthetic rate and regulate photomorphogenesis of plant. While the PAR spectrum of photosynthesis is from 400nm to 700nm, blue light (400nm ~ 500nm) and red light (600nm ~ 700nm) play key roles in photosynthesis, photomorphogenesis and chlorophyll synthesis. The far-red light spectrum effects photomorphogenesis. The chlorophyll content of rice leaf under blue light were 10% higher than under mixed light, especially chlorophyll a. Toward turfgrass, blue light can limit the growth of turfgrass. The leaf width and leaf color of *Z. japonica* cv. Lanyin No. III under blue light were higher and more dark than red light.

Phytochrome and photoreceptors In addition to the chlorophyll complex of photosynthesis, turfgrass contains a large variety of light signaling receptors feeling and "monitoring" in which the light signaling changes in the environment. Plant has been found that at least three types of light receptors: red and far-red photoreceptors phytochrome category, blue light photoreceptors UV2A and UV-light photoreceptors UV2B. Photoreceptors, which are called the entrance, can reset the time of plant's day and night bio-clock, so hundreds of genes' expression could be regulated.

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