Study on Winter-Green Technology for Sports Field Turf in Tropic and Subtropic Region of China

J. B. Xi
Sun Yatsen University, China

Y. Li
Sun Yatsen University, China

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J.-B. XI and Y. Li
School of life science, Sun Yatsen University, Guangzhou, Guangdong, 510275, China, E-mail: lssxjb@mail.sysu.edu.cn

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Introduction In tropical and subtropical regions of China, *Zoysia japonica* is substantially used to establish sports turf. Due to joint effects of climatic, physical and biological factors, the Zoysia turf is often withered and turns yellow in winter, leading to the reduced scenic and economic value. However, this period is the best time for sport games. How to sustain the view and function of Zoysia turf tropical and subtropical regions of China is one of serious questions needed to answered urgently at present (J.-B. Xi et al., 2001, 2002). In this context, the effect of overseeding technology on winter-green of Zoysia turf for sports field was assessed, so as to provide a theoretical basis for sustaining its development in China's tropical and subtropical regions.

Materials and methods Field study was carried out in Guangzhou Tianhe Sports Center Stadium in Guangdong province, China., The sport filed turf was established with Zaysia japonica Lanyin No.3 in the year of 2000. The top soil (0-30 cm) was mixed soil of 70% sand+10% peat soil+10% local soil. The turfgrass was planted with 3 seeding rates, 40g/m^2, 30g/m^2 and 20g/m^2 on November 22, 2005. The perennial ryegrass was used for overseeding. Conventional management was applied for sports turf. The emergence rate, establishing time and growth rate in seedling time were observed, and the index of plant density, texture, color, covering, uniformity, trampling resistance, underground biomass and synthetic quality were surveyed after the turf was formed. The integrated fuzzy evaluation was used to assess the effect of overseeding.

Results The seedling rate of overseeding ryegrass between different treatments had no significant difference ($P>0.05$). Forming time of the turf at the seeding quantity of 20g/m^2 was relatively later, no significant difference of forming time was observed between other treatments. The integrated preference scores shows that the synthetic characters of turf under overseeding treatment were much better than the control ($P<0.01$). The index of overseeded turf such as plant density, texture, color, covering, uniformity, trampling resistance, underground biomass and synthetic quality were all significantly higher than the control. Moreover, the turf character got better with the increase of overseeding rate, while the difference between overseeding treatment of 30 g/m^2 and 20 g/m^2 was not significant ($P>0.05$). In terms of the injury to Zoysia when ryegrass died in summer, there was a growing trend that the more serious injury to *Zaysia* turf and slower recover from injury were associated with the increased overseeding rate. Compare to the control in the same period, the turf character under the overseeding treatment was conspicuously worse ($P<0.05$).

Conclusions *Zoysia* turf overseeded with ryegrass had longer green-period and better turf qualities. The turf quality in winter, turf damage and renew growth in summer will be affected directly by the seeding rate. The synthesis turf quality got better with increased seeding rate, and the best overseeding rate was estimated to be 30g/m^2 from the quality of overseeded turf in winter and the injure of overseeding to *Zoysia* turf in summer. However, the optimum overseeding rate must be adjusted according to the arrangement of sports match event, as well as management levels in practice.

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