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Presenter Information

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Cool-Season turfgrass evaluation and analysis of effectors inhibiting turfgrass growth under camphor trees in Shanghai China

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Key words : cool-season turfgrass , evaluation , camphor trees , allelopathy , shade stress

Introduction Turfgrass usually cannot grow well under ornamental trees . Camphor trees (*Cinnamomum camphora*) are widely planted ornamental trees in southern China (Gao , 2003) . Evaluation of turfgrass cultivars and understanding the effectors inhibiting turfgrass growth would be beneficial to turf establishment and maintain under camphor trees .

Materials and methods Fifteen cultivars of seven species of cool-season turfgrass were evaluated in a field study beneath the canopy of five-year-old camphor trees in Shanghai China from 2005 to 2006 (Figure 1 , field test) , and turfgrass stands and visual qualities were observed . To investigate the factors inhibiting turfgrass growth under camphor trees , powder of fallen leaves from camphor trees (leaf powder) , soils collected from the camphor tree nursery (camphor soil) and out of the nursery (fellow soil , control) were bioassayed against seed germination and seedling growth of tall fescue (*Festuca arundinacea* Schreb) cv . Plantation in two chambers at 40 and 120 $\mu\text{mol m}^{-2} \text{s}^{-1}$ of PAR respectively at 25°C (bioassay test , Figure 4) . General ANOVA model and PLSD at $P=0.05$ were employed for the data analysis .

Results Although none of the fifteen cultivars in the field test could survive the environmental stress for more than seven months , Plantation tall fescue (Figure 2) and Langara Kentucky blue grass (*Poa pratensis*) (Figure 3) was relatively more tolerant to the stress under the camphor trees where light intensities were from 10 to 140 $\mu\text{mol m}^{-2} \text{s}^{-1}$ of PAR .



Figure 1 Evaluation of turfgrass under camphor trees 1.5 months after seeding .



Figure 2 Plantation tall fescue seven months after seeding .



Figure 3 Langara Kentucky bluegrass seven months after seeding .

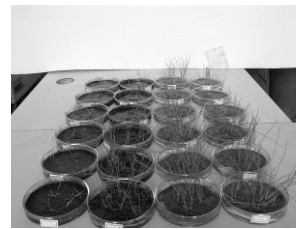


Figure 4 Germinating and seedling growth in mediums for bioassay test .

As compared to fellow soil , camphor soils did not significantly affect the germination and seedling height ; mixture medium of leaf powder and camphor soil (1 : 3 = w : w) significantly inhibited the seed germination by 43% and seedling growth by 25% , while leaf powder inhibited germination and seedling growth the most severely by 61% and 53% respectively . The inhibition effects decreased with the test time prolonged and enhanced under lower light intensity .

Conclusions Taken together with the weak persistence of turfgrass and the light intensities measured under camphor trees , results from the bioassay test suggest that allelopathic factors of camphor trees on turfgrass , interacting dramatically with low light intensity , may contribute to the weak growth and persistence of turfgrass beneath the canopy of camphor trees and some volatile chemicals might account for the allelopathic effects .

Reference

Gao , Z . Q . 2003 . The technical points of culturing rapid-growth camphor tree in Shanghai area . *Acta Agriculturae Shanghai* , 19(3) : 64-66 . (in Chinese with abstract in English)