Effects of Nitrogen Fertilizers on Growth and Turf Quality of Kentucky Bluegrass

Yuling Deng
Sichuan Agricultural University, China

Yan Peng
Sichuan Agricultural University, China

Yukuan Wang
Chinese Academy of Sciences, China

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

Effects of nitrogen fertilizers on growth and turf quality of Kentucky bluegrass

Yulin Deng[1] , Yan Peng[2] , Yukuan Wang[3]
[1] College of Forestry and Horticulture , Sichuan Agricultural University , Yaan , Sichuan 625000 ,PRC , E-mail : yulindeng66@ 126 .com ,[2] College of Animal Sicence , Sichuan Agricultural University , Yaan 625000 , PRC , [3] Chengdu Institute of Mountain Hazards and Environment , Chinese Academy os Sciences , Chengdu610041 ,PRC

Key words : Poa pratensis cv .Huntsville , nitrogen , fertilization , turf

Introduction Interest in turf establishment has boomed in many urban areas of China . Fertilizer application requirements are a key topic in turf management . Various formulations of N-based fertilizers are available for lawn turf . Previous fertilization studies with cool-season turf have used soluble , fast-release N formulations (Moore , R .W . , N .E . 1997) , or a combination of fast-and slow-release N formulations (Moore , R .W . 1996) . Little research has directly compared effects of conventional N fertilizers on introduced Kentucky bluegrass in China .

Materials and methods The experimental design was a factorial treatment arrangement with a control (without fertilization) (marked as H_1 ,H_2 ,H_3 ,H_4 and H_5 (CK) (Table 1) in a randomized complete block (2m × 1m , total 15 blocks) on Kentucky bluegrass (Poa pratensis cv .Huntsville) . Four conventional nitrogen fertilizers were added (ammonium sulphate , sodium nitrate ,ammonium nitrate and urea) under three repetitions . We also fertilizied 80 pots (Φ0 .23m × 0 .20m) with the same treatment regime to determine the biomass yield .

Results and discussion (1) Any kind of N fertilization significantly accelerated the foliation velocity and growth rate but without any significant differences among 4 N sources . In the early period after seeding , no significant effect of N fertilizers could be determined on bifurcating ability , but after growth , N fertilization in autumn could greatly improve bifurcation in next spring . Among 4 N sources , ammonium sulphate was the most effective application . Furthermore , turf-formation velocity could be accelerated . Compared with the control , turf on an N fertilized field could be formed 30 days earlier . Admittedly , N fertilization can effectively improve the turf growth and earlier formation .(2) 4 N fertilizers could significantly ($p = 0.01$) deepen the greenness . In spring growing season (see Table 1) , 4 N sources made no differences on their effects whereas in autumn growing season (from October to November) , Urea application could more significantly increase the leaf chlorophyll content of Kentucky bluegrass . (3) The experiment revealed that 4 N fertilizer applications could significantly increase the biomass of Kentucky bluegrass , but no difference could be testified for effects on aboveground biomass among different fertilizers .(4) Summer withering rate did not reach its peak in the warmest period till late September because of an accumulated high temperature effect . After September 17th , reviving would occur . For different N source applications , any treatment could significantly reduce summer withering rate and ammonium sulphate could be more effective .

Table 1 *Effect of N fertilizers on grwoth of Kentucky bluegrass .*

Treat ment	Average foliage		Growth rate (cm/d)		Average bifurcation		leaf chlorophyll content (LCC)				
	Apr 24th	May 14th	Before mowed	After mowed	Sep 14th	Next Apr 14th	May 13st	May 31st	Jun 11th	Oct 1st	Nov 4th
H1	2 .87 a	4 .43 ab	0 .167 a	0 .320 a	2 .69 a	4 .09 a	2 .21 A	2 .12 A	2 .01 A	1 .30 AB	1 .37 AB
H2	2 .80 a	4 .02 ab	0 .175 a	0 .310 a	2 .13 a	2 .41 bc	2 .19 A	2 .11 A	1 .94 A	1 .11 B	1 .17 B
H3	2 .82 a	4 .40 ab	0 .180 a	0 .360 a	2 .50 a	3 .77 ab	2 .10 A	2 .04 A	1 .93 A	1 .16 AB	1 .25 B
H4	2 .96 a	4 .92 a	0 .180 a	0 .320 a	2 .20 a	3 .32 c	2 .25 A	2 .05 A	1 .85 A	1 .42 A	1 .55 A
CK	2 .59 b	3 .82 b	0 .070 b	0 .190 b	2 .16 a	1 .97 c	1 .55 B	1 .69 B	1 .56 B	0 .63 C	0 .79 C

Conclusions N fertilizers can be effectively applied in turf establishment of Kentucky bluegrass in the sub-tropic area and can improve the foliation , growth of plants and turf formation and quality , and much better in autumn . Moreover , N sources can have different affects . Ammonium sulphate could be more effective for bifurcation and summer tolerance whereas urea for root growth and greenness .

References

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